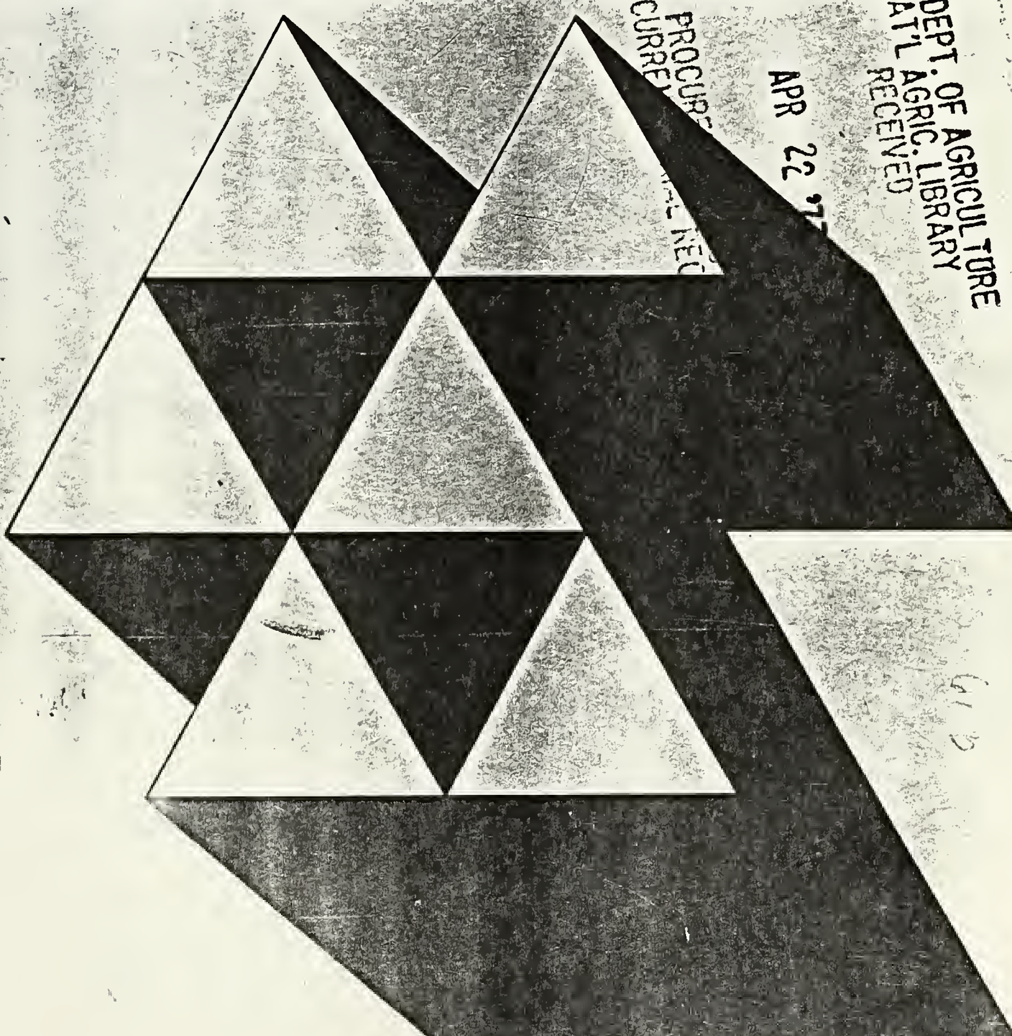
OUTDOOR RECREATION Advances in Application of Economics

(Proceedings of a National Symposium)



Forest Service
U.S. Department of Agriculture
General Technical Report WO-2

OUTDOOR RECREATION

Advances in Application of Economics

(Proceedings of a National Symposium)

Compilers
Jay M. Hughes, *Director*
Forest Economics and Marketing Research
Washington Office

and

R. Duane Lloyd, *Deputy Director*
Northeastern Forest Experiment Station

General Technical Report WO-2

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FOREWORD

The papers in this publication were selected from among those presented at a National Symposium on the Economics of Outdoor Recreation held at New Orleans, La., in November 1974, sponsored jointly by the Forest Service U.S. Department of Agriculture, and the Louisiana Tech University School of Forestry.

Professor Lloyd P. Blackwell, Director of the School of Forestry at Louisiana Tech University, was a collaborator in planning, organizing, and managing the Symposium.

Dr. J. Edwin Carrothers, School of Forestry, Louisiana Tech University, handled local arrangements. Dr. Dennis L. Schweitzer, Economist, Forest Service, organized a contributed paper session—from which over a third of the papers in this publication were taken.

Dr. H. Frederick Kaiser, Economist, Forest Service, helped provide strong leadership to the Symposium—especially in the discussions of theoretical and methodological problems of applying economics to outdoor recreation problems.

We appreciate the contributions of these, our coworkers, of the authors of the Symposium papers, and of the 120 lively participants in the Symposium.

JAY M. HUGHES,
Director of Forest Economics and Marketing Research, Forest Service, U.S. Department of Agriculture.

R. DUANE LLOYD,
Deputy Director, Northeastern Forest Experiment Station, Forest Service, U.S. Department of Agriculture.

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INTRODUCTION

Those who plan and manage outdoor recreation resources and opportunities, in the public sector particularly, are seeking better methods for doing their jobs. Generally, they believe that the economist has, or can develop, some theoretical and methodological tools that can help. Similarly, many economists believe that their field of science can contribute to better planning and management.

Over the years, both groups have been frustrated by the lack of progress. Planners and managers often have been disappointed that economists have not been able to provide them with clear answers or the simple, low-cost, analytical methods that seem to be needed. Economists, in turn, have been disappointed that planners and managers have not actually applied the economic concepts, models, and methods already available. Both groups have found that practical application of economic theory and methods to public-sector outdoor recreation has been a "tough nut to crack."

There is a continuing challenge to the economist to adapt his methods to this problem area. Planners, and managers too, continue to be challenged to put available economic tools to work. Both groups need continuing dialogue and cooperation. The science of economics will never provide all the answers for the art of planning, but it can make substantial contributions, particularly in dealing with the difficult questions of valuation and choice in allocating scarce public resources.

The need and the challenge continue and grow in importance. The Bureau of Outdoor Recreation (BOR) has a legislative requirement to prepare and periodically update a nationwide plan for outdoor recreation. Each of the States is developing its own comprehensive outdoor recreation plan with the assistance of the BOR.

The Forest Service, U.S. Department of Agriculture, recently was assigned by Congress the task of preparing: 1) A Renewable Resources Assessment; 2) a Renewable Resources Program and Statement of Policy, to be updated every 5 years; and 3) annual reports of progress on achievements under that program (Forest and Rangeland Renewable Resources Planning Act of 1974). In addition, there are the day-to-day needs of operating managers who must do the best they can to provide public outdoor recreational opportunities and to integrate recreation into the context of multiple use of natural resources.

Despite the frustrations, considerable progress has been made in recent years. These papers have been prepared to help document some of the important advances. Most of the progress reported here has been adaptation and development of economic theory and methods to outdoor recreation problems. Less progress has been achieved in getting the results of the research and development efforts into practical use.

These collected papers were selected from among the invited and contributed papers presented at a National Symposium on the Economics of Outdoor Recreation at New Orleans, La., in November 1974. The Symposium was jointly sponsored by the U.S. Department of Agriculture Forest Service, and the Louisiana Tech University School of Forestry. The purpose of the Symposium was to facilitate the application of economic science to policy formulation, planning, and management of outdoor recreation. The approach was to have economists doing research in this problem area summarize their work and related developments and to provide for discussion and interaction between administrators, planners, and managers and these economists.

We hope that the publication of these papers will benefit many who could not attend and participate in the Symposium. Here is an updated view of many of the significant accomplishments of economists applying their science to outdoor recreation problems. Unfortunately, there was no way for us to provide the reader with the benefits of the outstanding discussions at the Symposium. Similarly, there is less here on practical applications to planning and management than we would like to have; but this is merely an indication of the enormous work yet to be done.

Part I, *Setting the Stage*, provides some essential background to the overall topic, particularly in the article by Wennergren and Johnston. It also reports on prospects for the future, from three different points of view. Many communities have looked to recreational development as an important part of economic development. Jack L. Knetsch reports on that. Also reported in this section are two experiences in using economics and economists in planning and management.

Part II, *The Demand for Outdoor Recreation*, is fairly brief here. It was, however, a major component of the Symposium because it has been the topic most often discussed by administrators, planners, and economists. Presented here are viewpoints of an administrator, an economist who worked on a major attempt at national demand assessment, economists who have successfully developed and applied regional demand functions, and a non-economist who has successfully used market analysis techniques to forecast participation in camping.

Part III, *Applications of Economics to Outdoor Recreation*, presents a variety of papers reporting recent research accomplishments.

Part IV, *A Sociologist Among the Economists*, is a special section. George H. Stankey offers some thoughtful and thought-provoking ideas that should be useful to planners and that may stimulate some productive interdisciplinary research among sociologists and economists.

We did not include a discussion of the supply of outdoor recreation opportunities. The Symposium program did not provide for such a paper. Administrators and economists alike have been so preoccupied for so long with demand issues that supply analysis has been largely neglected. Here, then, is another challenge and opportunity.

Dialogue between the economist and the planner-manager has never been easy. The science of economics involves complex theories and specialized language. Discussions and interactions at the Symposium were good and helpful, but neither group was fully satisfied that we substantially contributed to the real application of these economic research results to day-to-day planning or management. From the discussions came a call for more teamwork between economists and planner-managers in solving real day-to-day problems. This approach is most likely to result in actual adaptation and application of economic science to outdoor recreation problems. This type of work is proposed in addition to, not in place of, continued research.

There also is an opportunity for new research contributions through digging into the fundamentals of human behavior as they affect individual choices and decisions about outdoor recreation. David A. King and Merton T. Richards have explored this in their paper, and W. F. LaPage has considered it from a market analyst's point-of-view. Some others (mostly social psychologists) are beginning to study these issues; but identifying the factors underlying choices and demand is a largely unexploited field for study.

A final observation is offered here: While economists and administrators still have some communication problems about public outdoor recreation, the response to the New Orleans Symposium showed a strong mutual concern for overcoming this kind of problem and getting on with the job. We feel these selected papers will provide a medium of interchange and a basis for heightened future dialogue.

Part I—Setting the Stage

ECONOMIC CONCEPTS RELEVANT TO THE STUDY OF OUTDOOR RECREATION

E. Boyd Wennergren and Warren E. Johnston [1]

During the last decade and a half, economists have given considerable attention to the economic analysis of outdoor recreation issues, including the nature of demand and the valuation of outdoor recreation. Beginning with the early work of Marion Clawson in 1959, following Hotelling's seminal idea a year earlier, economists have asserted the analytical capability of economic reasoning to assist investigative and policy processes related primarily to the allocation of public funds and outdoor recreation development and management issues.

In this paper, we discuss the economic characteristics of outdoor recreation that facilitate the application of economic theory to its study. In the process, we consider selected economic concepts and principles that are meaningful to economic analysis of outdoor recreation, rather than just describe the economic characteristics of outdoor recreation. In this way, we hope to provide you with an appreciation for the underlying economic nature of outdoor recreation and a general basis upon which to pursue more detailed inquiry during subsequent workshop sessions of this conference. Throughout this presentation, our frame of reference for the examination of outdoor recreation is on those activities traditionally provided outside the private sector through development and management decisions of public agencies.

Introduction

The need to subject activities like outdoor recreation to economic analysis is not always obvious to non-economists. Therefore, let us first turn briefly to a discussion of some basic questions.

The problems of economic organization are important to any society and involve decisions with respect to: (a) What types and quantities of goods and services will be produced, (b) who will produce the goods and services and by what processes, and (c) who will receive the goods that are produced. Decisions are required about the allocation of scarce resources (both public and private), because possible resource uses in our society exceed the quantity of resources available to us.

In order to decide the proper allocation of scarce resources among alternative resource uses, informed decisionmakers must know the values of the limited (scarce) resources as they are applied in alternative uses. Without such value estimates, the allocation process cannot function properly. Economic theory suggests that such allocation is most efficiently accomplished when the benefit grained per unit of a resource used in given productive or distributive activities is equal among all activities.

Generally, economists recognize two ways of attempting to achieve economic efficiency in the allocation of scarce resources. For market goods and services, the mechanism of the market and the prices that result from the free operation of supply and demand forces provides one basis for determining value. Prices determined in markets are indicators of value, and provide a basis for resource allocation. For example, investment flows toward the provision of commodities with higher economic returns and away from those with lower returns. Likewise, the purchase of commodities with higher prices suggests higher assigned values for those commodities by consumers (and vice versa). As consumers express their market preferences, consumer demands, in essence, express "willingness to pay" for market goods and services.

Conscious effort by analysts to derive implied values in the absence of appropriate market prices is the second means for achieving economic efficiency. Many times markets cannot or do not

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[1] Professors of Agricultural Economics at Utah State University and the University of California (Davis), respectively.

express appropriate allocative values, either because market pricing does not exist or the existing pricing mechanism does not account for all benefits and costs related to the transaction process. In these situations, economic efficiency in resource allocation must rely on the planning process and forms of collective action which presume the expertise of governmental technicians.

It is the fundamental need to achieve efficient allocation of scarce resources that leads us to require value estimates for alternative resource uses such as investments in the public provision of outdoor recreation. If we are content to permit *ad hoc* resource use and allocation (perhaps on the basis of political power or "least-friction" administrative decisions), and have no need to demonstrate productivity or contribution to social or individual welfare, then the concept of economic efficiency is irrelevant. If, however, we require some order and rationality to the allocation process, then value estimates are essential to achieve efficient allocation of scarce resources.

An important distinction must be made between exchange values and use values in the estimation of relevant values in which allocative decisions can be properly made. Exchange, or market, values reflect how much consumers will pay to have ownership rights to the use or consumption of a given commodity. They do not always reflect the value in use to the consumer.

Exchange and use values obviously can vary markedly and are conceptually very different. For example, a consumer may pay an exchange value of $20 for food items to sustain his life, but that expenditure which reflects, among other things, the value of resources used in food production, does not accurately reflect the value of the consumer's life, which is sustained by food. Other classical examples are diamonds, which have a high exchange value but relatively low use value, and air, which has an extremely high use value but a very low exchange value (at least before the days of excessive pollution when air was considered a free or non-scarce good).

We are, therefore, interested in the derivation of exchange values (whether they be real or implied measures of willingness to pay) as the basis for making efficient allocative decisions. It is important to recognize the difference in the two types of values since people often revert to the articulation of use values when expressing their position relative to outdoor recreation, i.e., "How can we possibly value the feeling one gets from seeing a beautiful sunset or even the thrill of 'shooting' the rapids of the Colorado River." Both may be deemed to be "good" and desirable. But the array of possible public investments exceeds available resources and, therefore, decisionmakers need to assign exchange values in order to allocate resources efficiently.

Now, lest you suspect that we have forgotten our assigned topic, let us describe the economic characteristics of outdoor recreation, a commodity not traditionally subject directly to market forces in the United States. And let us introduce the fundamental conceptual bases for analytical procedures that have been developed to estimate exchange values for use in allocating scarce resources among competing demands. The competing public demands might either be between alternative outdoor recreation investments or between those in outdoor recreation and other areas of public expenditures, say, flood control, watershed management, timber management, power, and the like.

Economic Characteristics of Outdoor Recreation

If one accepts the concept of consumer sovereignty, the logic of economics suggests that consumers allocate their time and money resources among goods and services in such a way as to maximize their satisfaction. Outdoor recreation is but one portion of the consumption bundle for which time and money resources are expended. As such, it possesses characteristics normally ascribed to other economic goods purchased by consumers.

Outdoor recreation activities *satisfy individual wants*. People recreate to satisfy needs, whether they be physical, social, or psychological, just as they engage in other forms of activity or as they consume other want-satisfying commodities. Therefore, outdoor recreation has the ability to satisfy individual wants, as is required of all goods and services of economic consequence.

Outdoor recreation is *subject to the law of diminishing marginal utility*. This economic law posits that additions to total utility are successively smaller as additional units of a good or service are consumed. (We shall return to this concept shortly.)

Lastly, outdoor recreation can be appropriated or acquired within the economic system and is

in *relatively scarce supply.* The latter characteristic is critical to the existence of value and, as one learns in an introductory course in economics, scarcity is the central issue of economics.

Recreation is a commodity that is basically esthetic in its attributes. One does not consume sightseeing, hiking, or fishing, as he does steak, nor does he use recreation in the same manner as he uses a new suit or hat. There are those who consider the intangibles of esthetic experiences immeasurable and apart from economic inquiry. Our previous reference to the valuation of a sunset is a case in point. But, any special consideration given to the esthetic properties of outdoor recreation is unjustified when we consider that many economic commodities also possess esthetic properties, and differ from outdoor recreation perhaps only in degree. Style-conscious Americans purchase more than warmth and body cover in their apparel; a steak dinner consumed at a restaurant satisfies more wants than mere physical need. Attendance at a movie, theatre, or athletic performance may be more closely akin to outdoor recreation since it involves "consumption" that is entirely esthetic in nature. Therefore, the esthetic properties uniquely attributed by some to consumption activities are not sufficient to dismiss economic analysis of issues pertaining to outdoor recreation.

Perhaps the most unique economic characteristic of outdoor recreation is its lack of a market price. Most athletic contests, movies, and theatre performances are market priced by the forces of supply and demand. Consequently, these prices can be used to efficiently allocate resources among alternative activities. The presence of market prices explains lesser concerns about valuation and allocation decisions related to forms of recreation or entertainment with high degrees of esthetics and subject to market forces of supply and demand. In the absence of a market price, indirect systems of valuation commensurate with those used to plan investments for the provisions of market goods are necessary if resources are to be allocated efficiently.

Although it lacks formal market pricing, outdoor recreation is *not a free economic good.* While the market price may be zero, or near zero, all goods and services compete for the time and money resources of consumers. The choice process requires not only weighing the direct expenditures of time and money, but also implies attention to the economic concept of opportunity cost. One measure of the cost of any activity is the value of the most valuable foregone alternative sacrificed by choice. While available at a zero—or very low—market price, consumption of recreation is limited by the alternative choices of the recreator, including the need for gainful and remunerative employment. Therefore, a form of economic constraint effectively regulates the consumption of outdoor recreation, even in the presence of a zero market price. If this were not the case, why would a pleasure boater ever leave the lake or a fisherman the stream?

Finally, the consumption of outdoor recreation is subject to time and money constraints and the same law of diminishing marginal utility as any other economic good. To illustrate this last point, consider figure 1. The marginal utility curve indicates additions to total utility as additional units of recreation are consumed. The marginal cost line reflects per unit time and money costs associated with increases in the consumption of recreation activity. In the absence of any time and money constraints, the recreationist would choose a large quantity of recreation (Q_1), since all increments of consumption up to that quantity add to total utility, or satisfaction. In the presence of time and money costs, however, consumption is limited to a lesser quantity, Q_0. At that level of consumption, the added satisfaction obtained from the last unit of recreation consumed is equal to the cost expenditure required for that last additional unit of recreation.

The Demand for Outdoor Recreation

Attempts to derive empirical estimates of exchange values for outdoor recreation have been significantly complicated by the absence of a formal market pricing mechanism. These efforts have, however, recognized outdoor recreation as an economic commodity and applied the conceptual logic of the economic theory of demand, modified to recognize the absence of explicit market prices.

Economists define demand as a schedule of quantities that an individual or group of individuals will purchase at various prices. Stated briefly, the quantity of a given commodity demanded by an individual is a function of the price of the commodity and demand determinants such as the income of the individual, his tastes and preferences, and the prices of alternative goods.

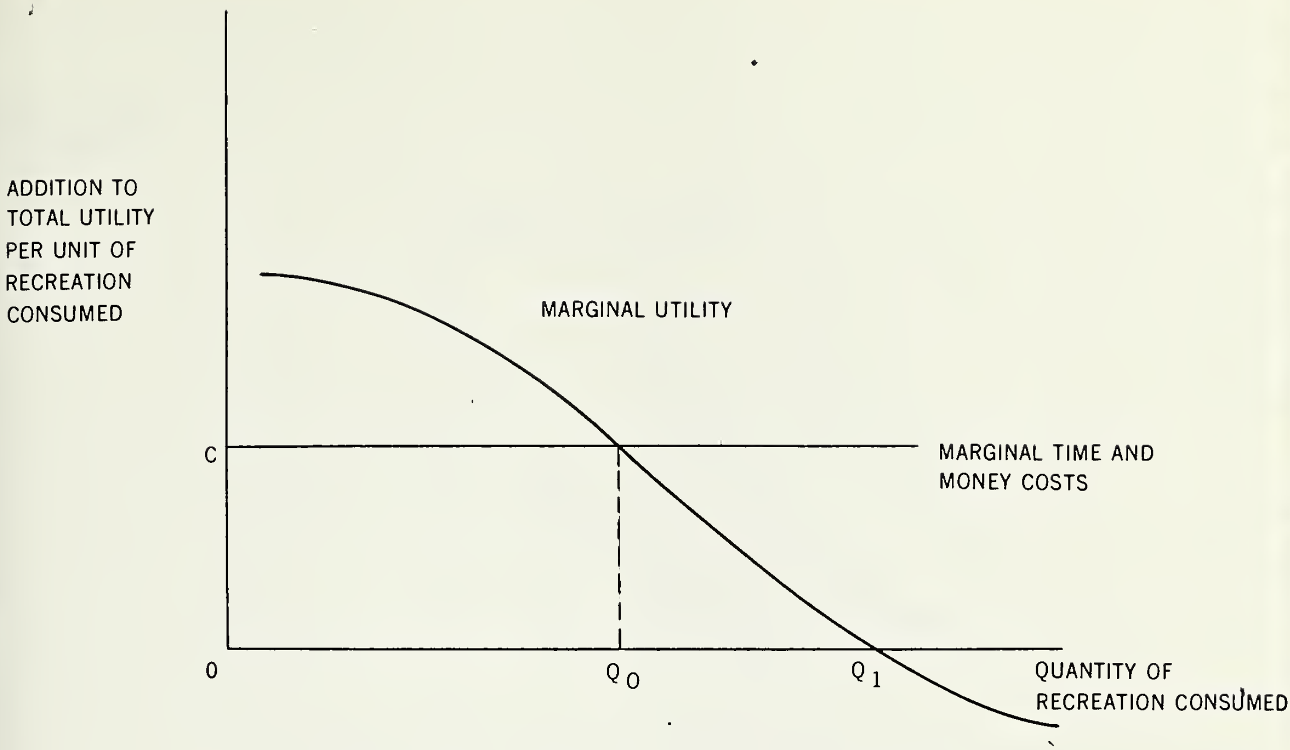

FIGURE 1.—Marginal utility and the consumption of increasing quantities of recreation.

Graphically, three demand functions are as shown in figure 2. The first demand curve, D_1, represents quantities demanded for alternative levels of price and given levels of the demand determinants indicated above. It incorporates, as do curves D_2 and D_3, the concept of quantities demanded at alternative levels of price. For example, we observe that quantity Q_1 will be demanded at price P; that at higher price P′, quantity demanded falls to Q_1'; and that at lower price P″, quantity demanded increases to Q_1''.

Changes in demand determinants shift demand curves. For example, as income increases or as tastes and preferences change toward favoring the commodity, the demand curve shifts to the right. This means that at a stable price, P, consumers will buy successively greater and greater quantities (Q_1 to Q_2 to Q_3) as demand shifts.

The concept of economic demand incorporates the important characteristic of price responsive quantities demanded by individuals and groups of consumers.

Demand does not involve just the quantity of goods consumed, the number of people recreating at a given location, or similarly misused planning concepts as per capita needs or requirements. Such concepts are descriptive measures devoid of economic content and inadequate to explain or to predict consumer behavior beyond the time of observation. They all too frequently have led to erroneous resource planning decisions as market conditions or determinants of consumer demands over time.

When we consider recreation demands within the context of the economic theory of demand, we find that the same types of constraints that influence market-priced consumption operate to constrain recreation consumption. And the same conceptual logic that underlies formal demand theory related to market goods is relevant to the analysis of the demand for nonmarket priced recreation where no market-determined price exists.

As a surrogate for market price, variable money costs are used in explaining variations in quantities of recreation consumed by recreationists. The logic supporting this substitution is as follows:

As illustrated previously in figure 1, utility maximizing levels of consumption are determined by marginal costs. Therefore, variable costs (those costs which vary with the amount of consumption) incurred in pursuit of recreation experiences con-

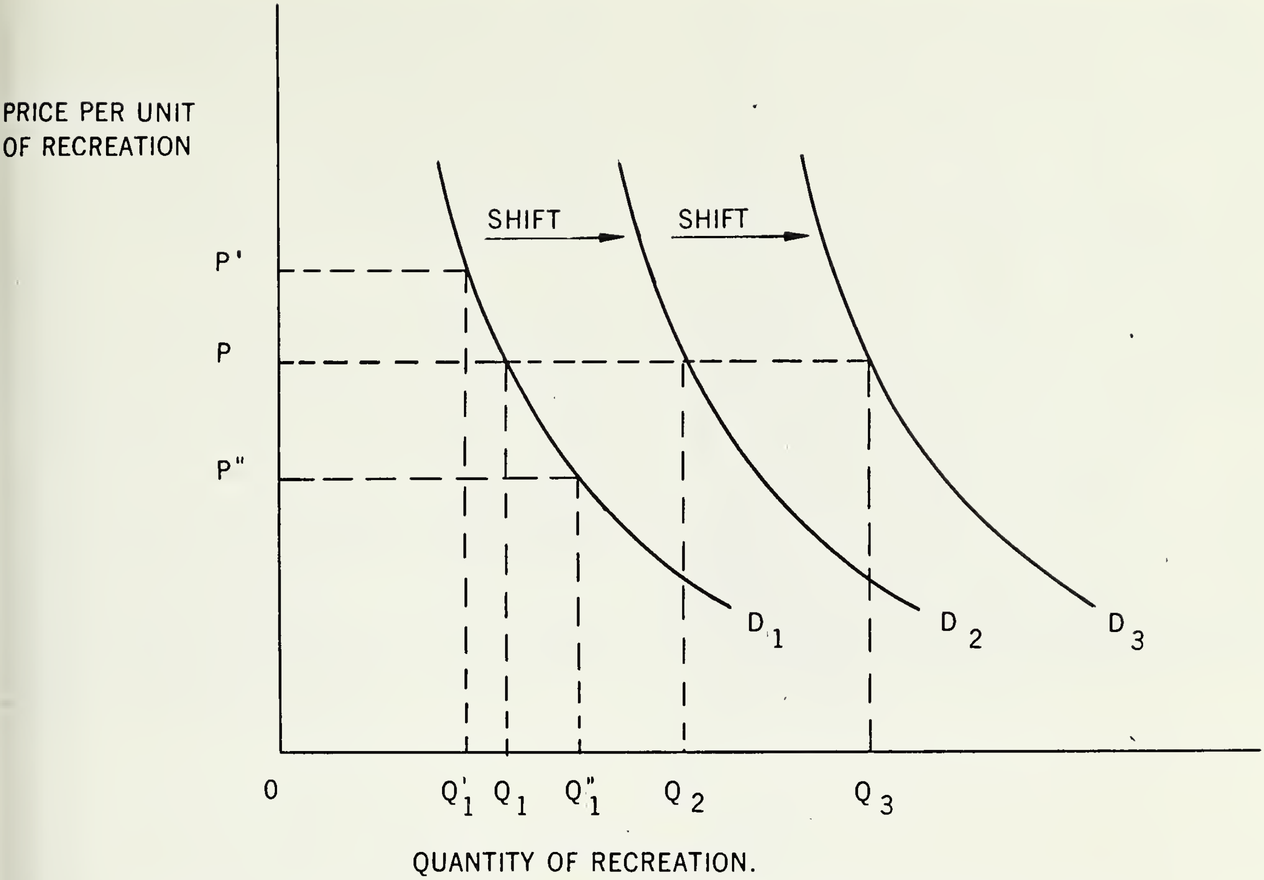

FIGURE 2.—The role of price and of shifts in demand on the quantity of recreation consumed.

strain or ration actual quantities demanded and logically serve as a substitute for the market price in estimating economic demands. Said another way, the number of trips which maximize a recreationist's utility for a season is determined by variable travel and on-site costs and not by the fixed cost of investments which have no relationship to the level of consumption. The current reliance on variable time costs only as a surrogate for market price indicates our interest in the development of an analytical estimate of time costs for future incorporation into empirical models of recreation demands.

Given these conditions, an individual's recreation demand may be viewed in the formal context of figure 2. The number of trips or recreation days he consumes (quantity demanded) is a function of variable use costs (the proxy for market price) and appropriate demand determinants such as his income, his tastes and preferences, and the costs of alternative recreational sites and activities. If the variable use cost is high, he will consume less than if it is lower. Furthermore, changes in income, or other demand shifters, may result in price and quantity adjustments equivalent to those inherent in analyzing market-priced commodities. The equivalent type of formulation can be developed for a specific recreation site, such as a hunting or fishing location.

Economists, therefore, see outdoor recreation as having economic characteristics and potentials for demand analysis equivalent to those of other types of economic goods. (The same applies to supply considerations, but time and space preclude a discussion of this increasingly important area of inquiry.) Demand analysis can be useful to decisionmakers as a tool leading to valuation of alternative non-market recreational activities and sites.

Demand Estimating Procedures

We have already argued that the consumption of outdoor recreation is subject to constraints similar to those for market goods and services. This means that both individuals and groups are

limited as to the amount they will spend to enjoy recreation experiences. The most relevant measure of value, therefore, is the "willingness to pay" for the experience on the part of the recreationist. Values thus derived are conceptually equivalent to those for other commodities since exchange values throughout the economic system are universally determined by the willingness of consumers to pay for given quantities at various prices.

The procedures for deriving empirical demand estimates for market-priced commodities can be legitimately applied to outdoor recreation with the modifications noted in the previous section. Detailed discussion can come in the workshop sessions. Here we will give just a short explanation of the reasoning used in order to disclose the systematic nature of consumer willingness to pay for outdoor recreation.

The object is to empirically develop the functional relationship illustrated in figure 2. The demand curve forthcoming from this procedure is an *ex post* description of consumers' willingness to pay for recreation experiences. In a simplified form, we need to determine the different numbers of recreation days that recreationists will take at various cost levels (variable travel and on-site expenditures). This assumes common and stable levels of all demand determinants except variable cost, although more advanced methodology can incorporate data for situations not meeting this assumption. Cost variations can be observed either over time (time series) or geographically (cross-sectionally). The latter is the data base for most recreation demand studies since extended time series data are not usually available.

In deriving a demand relationship for a given recreation site, average variable use costs are typically determined for users from different origins and related to the number of recreation days consumed. Each origin represents a point in the scattergram when illustrated graphically (fig. 3). Origins more proximate to the site with

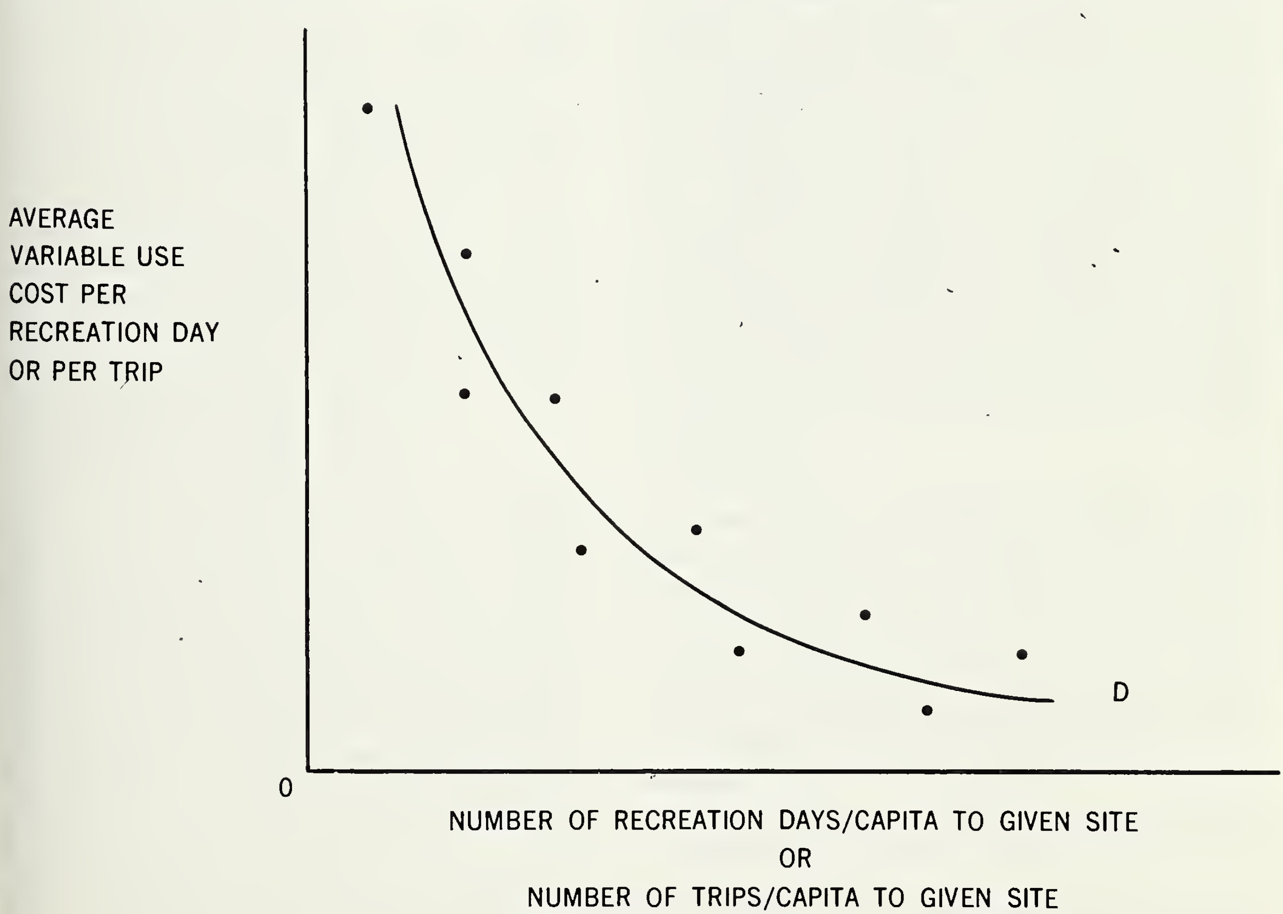

FIGURE 3.—The development of a hypothetical demand function (d) for recreation.

lesser variable costs to users can be expected to demonstrate higher levels of use and, conversely, more distant origins will be characterized by higher user costs and lower levels of use. The points generated from the various cities of origin, which are spatially related to the site, serve as the data base to which a mathematical function is fit as a statistical estimate of demand. The function defines the quantity of recreation days that will be taken by an "average" recreationist (the demand curve is based on averages) at a given site if he were subject to the different levels of average variable costs associated with use.

Valuation Concepts

The development of an empirical demand curve is not an end unto itself, but rather should be regarded as a means to obtain information useful to managers, administrators, and other decision-makers for policy purposes. One such use is the determination of site value.

The estimation of net recreation value uses the statistical demand curve (the revealed willingness to pay for a recreational experience) in its construct. While several valuation concepts are prevalent in the literature, all logically defensible procedures require the construct of an empirical economic demand curve. One commonly-used valuation technique is based upon the premise that the benefits of the experience accrue solely to the individual, and that the summation of all net benefits to individuals is the total net value derived from the recreation activity or site under study. This approach uses the concept of consumer surplus as described below.

Consider figure 4 where the demand curve, D, expresses the willingness to pay for recreation. The nature of the demand for this recreation experience is such that the recreator consumes some positive quantity (number of trips) as long as the variable use cost is less than c, the point of intersection of the demand curve with the vertical axis. Recall that as an individual rationally allocates his resources to recreation, he will consume or use increasing quantities of recreation up to the point where the marginal cost of the last unit consumed exactly equals the marginal utility of the experience (fig. 1).

Thus, a recreator with variable use costs of P_1 per unit of recreation will choose Q_1 units. This decision is forthcoming because OP_1 is both the marginal cost of the trip and the marginal benefit or marginal utility of the Q_1^{th} trip to the recreator. At that level of use, his total variable costs are equal to the price per trip (OP_1) times the number of trips (OQ_1) or the area OP_1aQ_1. The total utility (satisfaction) from that quantity of recreation experiences is $OcaQ_1$. We can make this deduction since the demand curve expresses willingness to pay for quantities, and the area under the demand curve to the intersection of the price line (a) and vertically to the horizontal axis Q_1—i.e., the area $OcaQ_1$—is the total utility from consumption or use. Since total costs are only OP_1aQ_1, the remaining, or surplus, area P_1ca is the surplus value (benefits) to the consumer of the recreational activity. This is equivalent to the concept of consumer surplus which holds for market goods.

Consumer surplus, then, is the excess of the expenditures which a consumer would be willing to pay for the level of commodity use ($OcaQ_1$), over that which he actually does pay (OP_1aQ_1).[2]

More detailed discussion of this valuation concept will follow in the workshops, including introduction to other static valuation procedures. But to summarize the implicit logic of the formulation of surplus value, we note that the demand relationship from real observations of recreationists' behavior provides an *ex post* statement of their willingness to pay and that it reflects total values (utility, benefits) received from the experience. If a recreationist rationally allocates his individual resources, the net utilities associated with the marginal trip to each site will be zero, since the marginal cost and marginal utility will be equal for that trip. This suggests that recreationists capture surplus utility on all except the marginal trip.

The rationale also suggests that recreationists get more surplus value from sites closer to their points of origin. Again from figure 4, recreationists living at the more distant—and, therefore, more expensive—origin with per unit cost of OP_2 will extract a surplus value equal to the area P_2cb. Obviously, this is less than the per capita surplus realized by individual recreationists from lower cost origin with per unit costs of only OP_1, for example.

Site values can be logically estimated from demand curves by adding consumer surpluses for

[2] To enlarge on this example, note that if the per unit cost were OP_2, the recreator would have chosen OQ_2 trips at a total cost of OP_2bQ_2, total benefits of $OcbQ_2$, and a lesser net surplus value of only P_2cb.

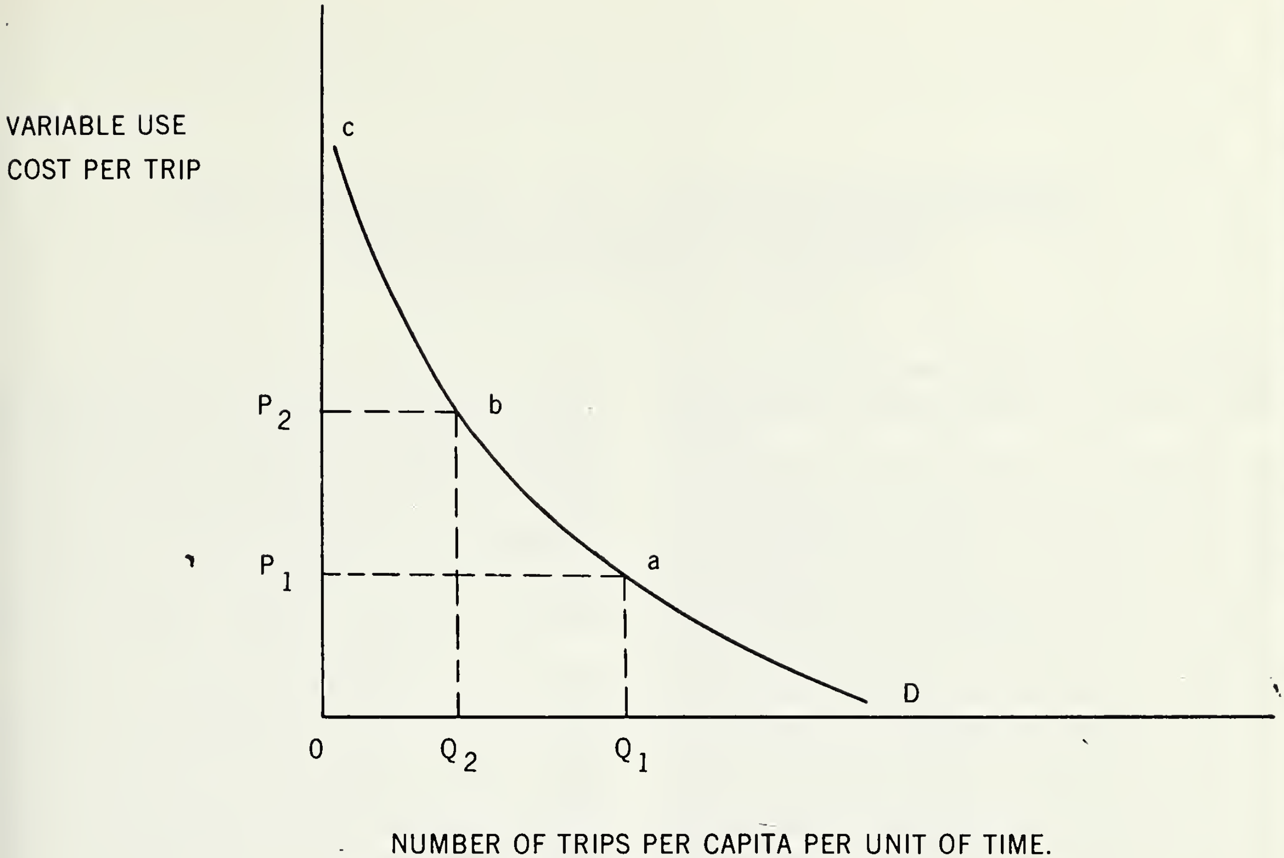

FIGURE 4.—The determination of consumer surplus.

all consumers from each of several origins; that is, multiply the "surplus value" determined for the average recreationist at each origin by the number of recreationists from the origin and add the products for all origins to obtain total site value for the annual observation period.

Lastly, the resulting annual site value can be used with the appropriate discount rate to empirically obtain an estimate of total recreation value for the site, or for sites with similar characteristics with appropriate adjustments for location, quality, etc. The resulting value may then be used by decisionmakers to compare benefits among competing alternatives. In the face of scarce public investment resources, we suggest that rational decisions should consider and favor developments or investments with potentially higher values.

Summary

Our major focus is directed toward concepts underlying economic demands. Review of a valuation concept introduces the usefulness of demand estimates to that endeavor. More detailed discussion of topics and concepts is merited. Subsequent sessions and workshops will, hopefully, provide that focus.

We want to re-emphasize our basic postulate that recreation is an economic good that differs from other goods in the economy primarily because recreational activities are not market priced. Our important analytical problems grow out of this deficiency, not out of the presence of esthetic properties. Also, the absence of market prices does not mean that outdoor recreation is free. Time and money costs constrain outdoor activities just as they do the consumption of market goods and services. Consequently, definable demands exist for recreation sites just as they do for other commodities. By substituting variable use costs for market price, economists can apply the logic and analytical power of demand theory to the analysis of outdoor recreation demand. Demand estimates and value approximations are prerequisites to economically efficient public investment decisions, which, in turn, are basic to efforts to maximize society's returns from public expenditures.

THE ECONOMICS OF OUTDOOR RECREATION AND THE FOREST PLANNER

Frank J. Convery and Chandler C. Smith [1]

This paper takes the perspective of the forest planner. The needs of the forest planner vis-a-vis the sub-discipline of outdoor recreation economics are addressed first, followed by a discussion of the extent to which these needs can in fact be met, given the present state of that art. A number of suggestions are then outlined for making the results of applied outdoor recreation economics more accessible to the forest planner.

Author Convery has worked for the past 3 years as a consultant on economics to the Planning Group, Southern Region (R–8) Forest Service, Atlanta, Ga. These remarks inevitably reflect this experience, and as such are perhaps most applicable to planning in that region. However, it is felt that the scope of the discussion is sufficiently broad to interest practitioners in other regions and in other institutional situations.

The Needs of the Forest Planner

The forest planner [2] typically articulates a range of alternative management strategies for the unit [3] under consideration, each with its own distinctive mix of inputs and outputs. Normally, the alternatives will range from high intensity of management, with relatively large inputs of labor and capital, to very low intensity management with few inputs.

An issue of economic interest arises at this stage: is each alternative cost effective in the sense of achieving the outputs specified in the least cost manner?

This question can usually be answered if we know the physical relationship between inputs and outputs and can value the inputs (costs). By simulating alternative sets of practices that will achieve the outputs specified, we can readily determine if each set of outputs will be produced in a least cost manner. Note that to accomplish this we do not need to place a common value on the outputs. We mention this because we have observed that analysts—including ourselves—tend to dwell very sparingly on this point, despite the fact that considerable cost savings may be effected without recourse to the more arcane methods of valuing recreation outputs which we discuss below.

Having identified the least cost means of producing various amounts of recreation capacity, the planner wants to know the quantities of recreation, by type, which will actually be consumed over time for each alternative, as a result of the provision of these capacities. Another issue then arises: how can these various inputs and outputs be made comparable, so that the decision maker can choose the alternative which maximizes net benefits to society? More specifically, can the recreation economist derive value estimates for the recreation outputs which are intellectually defensible, which are comparable with the valuation of other inputs and outputs, and which achieve a broad measure of acceptance among the groups involved?

Extent to Which Needs Can Be Met

There is a copious and still flourishing literature concerning the estimation and evaluation of outdoor recreation consumption. Typical of the earlier efforts to predict consumption [4] was the

[1] Professors, School of Forestry and Environmental Studies, Duke University, Durham, N.C.

We gratefully acknowledge the support of the Intermountain Forest and Range Experiment Station, Forest Service, Ogden, Utah, for support in undertaking this work, and especially Dennis L. Schweitzer, Forest Sciences Lab., Missoula, Mont.

[2] A term designated to embrace the planning team.

[3] The unit is a subforest planning area. Although this discussion is limited to a consideration of unit planning, it is generalized to other planning levels.

[4] For a good discussion of consumption prediction methodology, see Moeller and Echelberger (*15*).

comprehensive attempt made by the Outdoor Recreation Resources Review Commission in 1962 (*17*).[5] Using multivariate analysis, it was estimated that two-thirds of the anticipated threefold increase in recreation consumption by the year 2000 could be accounted for by population growth, two-ninths by individual tastes and preferences, and one-ninth by socio-economic factors. Although an "opportunity factor" was introduced to account for the influence of supply, this aspect was not given appropriate treatment until the pathbreaking study by Cicchetti *et al* (*7*) in 1969. They pointed out that the familiar "identification problem" arises when one tries to interpret time series recreation consumption data, i.e., one cannot be sure to what extent changes in consumption over time are the result of shifts in the demand or supply schedules.[6] An econometric problem requires an econometric solution: if we want to interpret time series data with a view to making projections, we should employ the techniques which have been developed for applying statistics to economic data. Further, an area-wide or regional analysis is called for, since future consumption at one location depends in part on supply and consumption responses at other "competitive" locations. A recent study by Brown and Hansen (*3*), cited by Knetsch (*12*), incorporates supply and demand factors in a consumption prediction model for reservoir recreation in Texas.

Since the projections made in the 1960's (e.g., Outdoor Recreation Resources Review Commission (*17*), Boyet and Tolley (*2*), Chicchetti *et al* (*7*)) are coming due shortly—1976 and 1980 were popular benchmark projection years—we can begin to validate these predictions, perhaps adopting Friedman's view that the internal workings of a model are not important as long as it "delivers the goods"—i.e., adequate predictions.

When we turn to the second issue, how to value recreation outputs in terms comparable with other inputs and outputs, we find a veritable mountain of material,[7] starting most importantly with Harold Hotelling's extraordinary letter to the Director of the National Park Service in 1947 (*16*), sketching the outlines of the "travel cost" means of determining a demand curve for outdoor recreation, from whence dollar-valued economic benefits generated by the park can be calculated. The elaborations of Hotelling's ideas by Trice and Wood (*18*), Clawson (*9*), Brown *et al* (*4*), and Clawson and Knetsch (*8*) are familiar, and comprise the intellectual lodestone around which most recreation economists have centered their work. Burt and Brewer (*5*) provide a recent example of the direction taken by this intellectual mainstream: using sophisticated econometric techniques, they estimate the social benefits associated with a proposed water-oriented outdoor recreation site in Missouri by developing a set of demand equations, one for each existing recreation site in the potential market area of the proposed site, and then determining the net change in benefits over all sites resulting from the implementation of the new proposal. It should be noted that, as in the case of recreation consumption projections (also a necessary part of the Burt and Brewer study), an area-or regionwide perspective, as opposed to a single project orientation, is necessary for this task. The "travel cost" method of evaluating outdoor recreation builds directly on the use estimation models discussed above. The initial estimate of attendance at a site is a point estimate on the demand curve, usually the quantity demanded at zero price. The other points can be determined by simulating successive changes in the entrance fee, using travel cost increases as proxies for price.

Krutilla (*13*) points out that there are instances where the use of present prices and costs, even when they can can be determined, can lead to erroneous results. He identifies an asymmetry in the valuation of the benefit stream resulting from development of natural resources as compared to the benefit stream resulting from leaving them in their natural state. It is argued that the real price of outputs from the development alternative tends to fall over time as a result of cost lowering through technological

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[5] Number in parenthese refer to Literature Cited.

[6] Thus if wilderness capacity were not to be increased, after use had reached full capacity it would likely remain approximately constant from year to year. The unwary analyst of time series data might conclude that "demand" for wilderness recreation had peaked, and that provision of additional capacity in this area was unjustified.

[7] For an excellent evaluative review of this material, see Kalter (*11*).

development. Conversely, the price of the non-development alternative is likely to rise since there are no close substitutes, supply being essentially fixed or declining, and such outputs—e.g., wilderness recreation—are quite income elastic. He also points out that the preservation alternative has option value—the development alternative can be indulged at a later date if this appears to be desirable—while the development alternative does not, in the sense that it is rarely possible to revert to the natural state once development has taken place.

Cicchetti and Smith (*6*) have attempted with some success to identify the optimal use intensity of a wilderness recreation area. Interpreting the results of a user survey, they explore the tradeoffs between increasing utility through adding an initial visitor and decreasing utility suffered by present users as a result of increased encounters. Optimal capacity occurs at the point where the utility added by the additional user equals that lost by those already there.

We favor the approaches outlined above to the recreation valuation problem, but will not get involved in exhaustive comparisons with the numerous alternative methods which have been suggested save to point out that the Hotelling *et seq.* approaches are consistent with the manner of pricing stumpage.[8] Stumpage price is derived as a *residual*, the balance remaining after all other costs have been deducted from the delivered mill price. Similarly, the Hotelling *et seq.* approaches yield what the recreationists would be willing to pay for the experience after all other costs have been covered.[9] In this context, we feel that the term "consumer residual" would be more appropriate than the more conventional "consumer surplus" designation.

Two further methods for the valuation of outdoor recreation have recently been published, and deserve comment. The Southeastern Economic Survey of Wildlife Recreation, completed by the Environmental Research Group at Georgia State University (*10*), involved quite an elaborate household survey, whereby a sample of householders in the region were asked to place a monetary value on a day of various fishing and hunting experiences, and this was crosschecked by determining what participants would need to be paid to forfeit a day's activity, together with the number and value of days taken off without pay to participate. Average fishing values per day ranged from $48.31 for saltwater fishing to $26.41 for trout fishing; average hunting values per day ranged from $60.86 for big game hunting to $39.14 for small game. Non-consumptive uses, such as watching and photographing wildlife, were valued at over $65 per day. Applying these data to all participants in the Southeast, it was estimated that hunters would require $5.193 billion to refrain from hunting, fishermen would require $10.98 billion to refrain from fishing, while non-consumptive users would require $15.33 billion to refrain from such uses, for a total annual value of $31.5 billion [10] ($24 billion if the value placed on use is adopted instead of the "compensation required" value). A credible argument can be made that public outdoor recreational resources should be valued at the amount that consumers would require as compensation for deprivation of these resources, rather than what they are "willing to pay" for their use. The courts have not yet made a definitive ruling as to which value criterion should apply to outputs from the public lands. In the absence of such, we feel that the more conservative "willingness to pay," which is of course bounded by "ability to pay" should be used. Further, the use of average values is not appropriate when evaluating decisions at the margin. In addition, it is not clear that the values derived in the Environmental Research Group's study are in fact residual

[8] Beardsley (*1*) has claimed, apparently supported by Lundgren (*14*), that the consumer surplus measure is not comparable with market value. For goods that sell in a competitive market, the supplier is faced with a horizontal demand curve, and there is no consumer surplus for an increment of supply. In the case where the supplier is faced by a sloping demand curve, consumer surplus does result from an increment of supply. Using the area under the demand curve up to the quantity actually consumed in both cases as the measure of value will result in market value in the former case and consumer surplus in the latter, two entirely comparable measures.

[9] It is interesting to note that an isolated lumber mill surrounded by wood of uniform quality would be in some sense analogous to the recreation site situation posited by Clawson. Differential transportation costs would then be determinants of variance in price, especially so if the wood seller behaved like a discriminating monopolist.

[10] The capitalized value of the Southeast's wildlife resources at this rate would amount to $893.4 billion over 50 years at a 10 percent discount rate.

values, i.e., the value placed on the day's activity by the user after all other costs have been taken care of.

At the other end of the value scale, the Water Resources Council (*13*) recommends a range of \$0.75–\$2.25 for general recreation day use including hiking, swimming, camping, etc., and \$3.00–\$9.00 for specialized recreation day use, including big game hunting, overnight wilderness hikes, etc. Even after these values have been converted into visitor-day terms, they appear to be highly conservative. The authors have done some preliminary work which seems to indicate that the rates actually being charged at State facilities in the Southeast approximate those recommended by the Water Resources Council. The Water Resources Council's values are frequently applied to recreation consumption projections derived using a zero or very low price. To the extent that the quantity of recreation actually consumed would be less if the Water Resources Council's value were charged, the resulting value estimate will be an overstatement. If, as we suspect, the demand for most types of outdoor recreation is fairly price inelastic within the Water Resource Council's price range, the error involved will not be very serious. A more intractable problem results from the method's inability to distinguish adequately between different types and qualities of recreation, thereby unduly favoring activities which generate larger numbers of participants.

Improving Planner Access to Evaluative Techniques

How can the projection and evaluative techniques deemed most appropriate be most advantageously applied in the field? We have already observed that application of these techniques requires a regional perspective together with considerable sophistication in statistical-econometric technique. We can add to this the fact that planners, ourselves included, invariably seem to be in a rush, feverishly trying to meet deadlines and get various phases of the project out of the way, to the extent that we sometimes give the impression of subscribing to the philosophy of the former Yankee pitcher, Lefty Gomez, that: "I'd rather be lucky than good."

Clearly then, some linking mechanism is required, to make the developments in recreation economics available to the planning fraternity. We recommend that a group of highly trained social scientists [11] be established with the explicit purpose of providing expertise to the planners. We realize that there are few such individuals presently employed by the Forest Service, and even fewer still in the other land management agencies, but feel that this is the area on which any anticipated expansion in planning budgets should concentrate. On the recreation front, such a group should:

1. Establish priorities for analysis. Each unit plan involves examining a number of alternatives, often with proposed recreation use ranging from very developed to very dispersed. Doing a rigorous analysis of even one unit will involve a considerable commitment of high priced intellectual resources. A ranking of areas in the order of their importance in terms of such factors as litigation potential, opportunity costs foregone in the event the "wrong decision" is taken, irreversibility implications, etc., is therefore required.
2. Divide the jurisdictional area up into market areas for each type of recreation, and make projections of recreation consumption. This will require cooperation between the major Federal (Forest Service, National Park Service, Bureau of Land Management, Army Corps of Engineers) and State agencies and perhaps the private sector, but the Forest Service should take the initiative, since it alone has the technical capability to adequately foster such a program. Such an effort may possibly be already underway under the auspices of the Water Resources Council since estimates of "requirements" of various outputs at the regional and river basin level are mandated in the principles and standards published in 1973 (*19*).
3. Apply econometric methods to the evaluation of the recreation alternatives in the areas already identified as being of high priority. In this regard, special attention should be paid to areas where some of the proposed alternatives have irreversible consequences. In such cases, the extent to which development alternative decreases in value over time and the preservation alternative

[11] Far beyond the scope and resources of the present planning group in the Washington Office, Forest Service, U.S.D.A.

increases—as suggested by Krutilla (*13*)—should be carefully explored, and the results integrated into the analysis of alternatives. Much of this work could, of course, be done on contract by universities, research organizations, etc.

4. In areas of lower priority to which sophisticated evaluation techniques cannot be applied because of resource and cost-effectiveness limitations, guidelines can be developed for the implementation of less elaborate approaches, down to and including the Water Resource Council's administered prices, and recreation consumption projections based on intuitive correlations with anticipated population and income shifts.
5. Very careful attention should be paid to the evaluation of the non-recreation outputs expecially timber. This is so because if wood production is determined to be inefficient socially, then a recreation use will often emerge by default, i.e., an elaborate evaluation of the recreation alternative may not be necessary.

What we are arguing in favor of, in essence, is the full-involvement of a highly-trained cadre of social scientists in the forest planning effort. Many researchers will resist this notion, preferring to putter about like Mendel in his monaastery pea garden, divorced from practical affairs. We feel, however, that evaluative technique now provides the limiting factor in the planning effort, and that the suggestions outlined provide a means for welding increased complexity of technique to the pragmatic requirements of the planner on more than an *ad hoc* basis.

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OUTDOOR RECREATION AS A VECTOR FOR ECONOMIC DEVELOPMENT AND OTHER SOCIAL PROGRAMS

Jack L. Knetsch [1]

The title given this paper seems to carry the presumption that providing outdoor recreation opportunities or the development of recreational areas can be made to further the goals of increasing economic and social well-being. In sum, and for most types of provision, there is probably merit to this. However, as is also implied by the title, there is more than one dimension to such betterment, and the varied nature of the impacts is an issue as is the net balance.

There are economic gains that are associated with recreational development, and economies—particularly, local economies—can benefit substantially from expenditures associated with the use of recreational areas. There are as well other—in some instances, less direct—impacts that also accompany this use, these having to do with not only economic consequences, but social and environmental as well. There is then a diversity of interests that exists with respect to any development, and the nature of the impacts varies. The intent here is to discuss several aspects of at least several of the consequences of recreational development in turn and to point to some of the possible implications of them. This may help to organize the issue and aid our common understanding.

User Values or Benefits

In the first instance, recreational investment—that is, the provision of facilities or areas for recreational purposes—creates a product, or really a service, which has value to people using the facility or area. If the recreational opportunity meets some demand, then people indicate by their use that they are willing to give up alternatives that they could obtain with like expenditures of time and money in order to enjoy the benefits of the recreational experience. This is an expression of real economic value whether or not the recreation services are directly priced, that is, whether or not users pay for them. Much publicly provided recreation is not priced and paid for by the direct beneficiaries of the service or output of the investment but this non-market nature of the use—where money is not actually exchanged—does not make the economic value less real.

The recreation investment yields an output for which people are willing to pay, i.e., to forego other products. In principle, the value to them is measured by the amount of their willingness to pay. This is as it is with most products produced in an economy; their direct worth or economic value is measured by what people will sacrifice to obtain them. Thus a $10 item is viewed to be worth twice as much as a $5 item because people apparently are willing to give up twice as much to obtain it.

Those economic values which accrue to the users of recreational resources are sometimes referred to as primary benefits of the investment or policy. At least an efficiency objective can generally be satisfied if those direct gains outweigh the costs of provision—the latter are the values that all of the needed resources could have yielded in some alternative use. We are better off making provision in such cases because the total yield from our available resources is made larger. We might note here that if some of the needed resources—labor, for example—are unemployed or otherwise not producing, the real economic costs are far less than their nominal costs.

User values are not routinely measured. But studies in which I have some reasonable confidence show that recreation sites often yield benefits of substantial economic value to the users. The recreation associated with reservoirs, for example, is often worth hundreds of thousands of dollars yearly and sometimes millions.[2] Other recreation

[1] Professor, Simon Fraser University, Burnaby, British Columbia.

[2] Jack L. Knetsch, Outdoor recreation and water resources planning, American Geophysical Union, Water Resources Monograph 3 Washington, D.C., 1974.

sites yield similarly large benefits as may free-flowing streams—the latter, incidentally, may yield greater value than dammed streams even while catering to fewer people.

There may be some further primary gain from the provision of recreation opportunities, but the evidence does not seem conclusive. Mental well-being of recreationists could be enhanced, as could their productivity, thereby benefiting others beyond the individuals participating. And some of us may benefit by less crowded conditions as people are spread among more recreation sites. But these are probably of lesser significance to our main concerns.

One further point perhaps worth note in regard to user benefits is that the satisfaction received by recreationists or visitors to an area can be influenced by not only the facilities or attractions of an area or region, but by ancillary facilities and accommodations as well. Recreation and tourism planning, for example, have frequently paid little attention to these influences, probably to the detriment of the well-being of visitors and most others as well. Casual impressions and discussions with planners and travelers alike suggest that much can be done to improve not only satisfaction levels of visitors but the health of the industry as well.

Another economic consequence—related to user benefits—which is receiving increasing attention has to do with the so-called option demand for recreational facilities. The general idea here is that there may be a desire or willingness on the part of many to sacrifice something or pay something to preserve or maintain important environmental resources or recreational opportunities even if at the present time we make little use of them because we wish to preserve the option of making use of them at a later time or having them available for succeeding generations. To the extent that the development of recreational facilities is consistent with the goal of maintaining these assets in a form that would satisfy this demand, this may be an added justification for such investment, although it might also call for alterations in form.

Expenditure Impacts

Actual expenditures by visitors or tourists have another kind of economic impact quite apart from the measure of welfare gain accruing to visitors. These expenditures are in the main outlays for such things as meals and food, lodging, gasoline and other travel expenditures, equipment purchase, and rentals and supplies. With little doubt, the amount of money associated with the enjoyment of recreational opportunities and leisure travel is large in aggregate and growing. It is an important concern, and especially so to local communities standing to benefit from what is for them an export commodity. As Claire Gunn has observed, the expenditure has often shifted the view of communities from accepting tourists as guests to catering to them as consumers and customers.[3]

The expenditures made for local goods usually fall into a fairly consistent and narrow pattern. But even among these few categories the impacts vary substantially not only because of differences in totals but in their different requirements for local and nonlocal labor and materials.

The initial expenditures of visitors in a region provide the direct or first round of receipts to the regional economy. These dollar flows, however, do not represent incomes to local residents. Depending on the kind of commodity or service purchased, more or less of each dollar must in turn be paid out for the stocks or materials used or sold, and some may accrue as profits and other payments to non-residents. For example, a dollar purchase of gasoline has a far smaller impact on the local economy than a dollar of lodging. This is due to the larger proportion of the former needed to pay for imports of petroleum products and the large component of local labor and local services in the latter.

Thus much of the initial revenue flow "leaks" from the region. The extent to which this occurs will depend on the size and nature of the local economy, and in particular the extent to which supplies to local businesses come from other firms and individuals within the same region. In general, the smaller and more rural regions would be expected to experience greater leakage to outside suppliers.

Some of the original receipts however, will remain in the region to be paid to local suppliers as well as to local individuals in the form of salaries and profits. Consequently, local output is increased, calling for further labor and additional

[3] Claire A. Gunn, vacationscape: designing tourist regions, Bureau of Business Research, University of Texas (Austin, 1972), p 6.

supplies. Again, the extent of these indirect impacts of the initial revenues will vary with the nature of the expenditures and the local economy.

As wages, salaries, profits, and other local income payments increase because of visitor spending, local consumption will increase as these increased incomes are at least in part spent locally. This will induce still further local income; again depending on local conditions and also on the propensity of residents to spend money for locally supplied goods and services.

These direct and indirect effects are often summarized in so-called multiplier effects.[4] One commonly used describes the sales multiplier which measures the effects of visitor spending on economic activity or total sales in the area. Another multiplier measures the impacts of these revenues on incomes to residents of the areas as a result of direct and indirect activity. Thus a dollar of visitor spending may result in perhaps 2 dollars of local sales, and finally 35 cents of added income to local residents.

A third multiplier is an employment multiplier which describes the total employment impact stemming from that generated by the initial spending. The employment effects can be substantial in a community affected by visitor spending. Taken as a whole, recreational and tourism expenditures and the indirect impacts related to them tend to be somewhat more labor-intensive than average, indicating that dollars spent in a community on these goods and services tend to have a greater impact locally on labor demands than others taken as a whole—the variation of course is large among these other categories.[5] On the other hand, the expenditure pattern tends to be highly seasonal for most communities and the direct labor demands tend to be for low-wage, low-productivity occupations.

The impacts of tourist and visitor expenditures can be significant. Those localities standing to gain proportionately in terms of spending patterns may be materially aided in their economic development, at least looked at from the point of view of increasing expenditures, economic activitity, job levels, etc. The extent of the advantage, of course, depends upon locational superiority, kind of facilities offered, the natural and man-made attractions of the area, and many other things having to do with the marketability of the community, as well as the nature and size of the local economy.

There is still another dimension to the economic impact of visitor spending in a region. This has to do with the incidence of the economic costs and gains within the community itself. There is, of course, no doubt that these expenditures benefit innkeepers, taxi drivers, tour operators, ticket agents, and similarly situated individuals together with their employees. And the firms and employees directly servicing these enterprises, such as construction, dry cleaning establishments, linen services, wholesalers, etc., will also gain. But these gains certainly accrue disproportionately among members of the community. Surely there are those who gain little if at all. Many individuals may bear costs of increased congestion, reduced opportunities to enjoy local amenities, and higher prices. Many are made less well off.

Ownership is often outside of the region—or even outside the country in some cases—with profits and other returns accruing to non-residents. Also development often results in the value of private land holdings with the owners sharing disproportionately the resulting economic gains. The problem of incidence is an issue of growing importance in efforts to encourage economic development based on tourism and recreation expenditures, but one on which we have little information. We are usually in poor position to discern which groups within the community stand to gain how much and which groups stand to lose.

Another—often major—interest concerns the role of visitor expenditures and their impacts on local economies in assessing the value of recreation investments as they contribute to greater total output or product of the economy taken as a whole. In the main, the answer seems to remain that it is minor. There may well be reasons to favor some regions with public investments to foster greater economic gain in such areas, but greater total output is not a major reason.

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[4] A good discussion of issues and problems is given in Brian H. Archer, "The uses and abuses of multipliers," Tourist Research Paper TUR 1, University College of North Wales, Great Britain, 1973.

[5] Robert J. Kalter and William B. Lord, "Measurement of the impact of recreation investments on a local economy," American Journal of Agricultural Economics, Vol 50, no. 2, May 1968, pp 243–57.

If we have generally full employment, reasonable mobility of labor and other resources, and some semblance of competitive conditions, then the gain to the whole economy from added activity in any region is certainly minimal. If these conditions are reasonably met, then any secondary beneficial impacts brought about by provision of recreation opportunities on market related activities are simply local or regional in nature with offsetting effects occurring elsewhere. If funds or resources are diverted from other sectors for the purpose of a particular investment, not only are the primary impacts of the foreclosed investments foregone, but so too are any net secondary impacts—there usually being no reason why we would expect more secondary activity from this spending than from any other. If we were to credit the investment with the secondary impacts that occur, we would then also need to take into account the secondary impacts that are foregone by diverting the investment to this use.

However, if the assumptions of full employment and mobility do not adequately describe prevailing conditions in a region, then some of the secondary effects do represent net additions to total product. For example, if there is more serious and intractable regional unemployment, then efforts to increase secondary activities which will employ labor in productive pursuits will add to economic output. But the extent of this depends on the level of the unemployment—and in no case is all a gain.

The issue of regional disparity is important and it is generally of interest to seek a wider sharing of benefits and opportunities. But we can expect greater enthusiasm for investments that will generate secondary spending from individual localities which stand to be relatively large gainers.

Environmental Impacts

There are, then, two kinds of economic consequences associated with recreational development—represented by the values accruing to the users and those of the associated expenditures. But there are other consequences beyond these which have direct impact that are considered to be of value as well and are related to development objectives. One such consequence certainly is the effect of the development on the quality of the physical environment.

The major issue in considering environmental goals, as distinct from ones of more traditional economic gain differs from that surrounding a concern for greater equity in the distribution of costs and benefits. It does not, for example, involve any trade-off with efficiency objectives but focuses instead on selecting the most valuable alternative course. The question of what constitutes the greater value is the basis for many, if not most, of the differences and possible conflicts. And while the varied incidence of gains and losses adds to the problem, resolution is probably most hampered by the fact that whereas the more traditional benefits and costs lend themselves to some measurement, the impacts on the environment have not been the subject of much useful direct quantification.

To the extent that commitment of resources to recreational use is consistent with attaining or maintaining a desired level of environmental quality, this, of course, can be an important justification for expanding recreational facilities. That is, committing resources to recreation use, especially as compared to some other types of exploitation, may in fact be to the significant advantage of preserving or enhancing the environment. However, this may not always be the case. In any event, the development that too often accompanies recreational development, especially—but not exclusively—the commercial enterprises that generate the major economic impacts, may be to the disadvantage of what we are increasingly coming to regard as improvements in our surroundings. Certainly quality is an imprecise term and a matter of individual preference, but unnecessarily tasteless commercial exploitation is a major source of discontent and complaint among leisure travelers and those using recreational areas.

The desirable character of many areas can be spoiled easily with even low levels of improperly sited and poorly designed facilities—the amenity of an area is often fragile and susceptible to serious degradation. But scenic amenity is increasingly of greater importance to more people; witness the great distances that people are willing to travel to enjoy what they have been promised or what they regard to be unspoiled surroundings. Good planning and good design could do much in this area, but in the past there has been all too little of it.

In part, the problems of excessive environmental costs in development are related to the usual domination of small firms and enterprises in the industry and the fact that the environmental cost imposed by each is borne by all rather than by the responsible firms alone. There is consequently little incentive on the part of any single development to lessen the negative impacts on scenic amenities—with the result that they are degraded for all.

To suggest a more conscious attention to environmental impacts is not, of course, to call for an end to all development. This would surely confuse prescriptions. If it is the negative features which bother, these should be dealt with rather than attempting to do this by more costly and tenuous means.

Without doubt, impacts on the environment are an important dimension to the value of recreation development. And any notion of net advantage must surely take these impacts into account.

Social Impacts

Another dimension of the effect of recreational development—and particularly of the resultant numbers of visitors coming into an area—is a range of things that might be termed the social impacts. These, too, are becoming matters of increasing concern.

There are gains in terms of social benefits of communication, cultural experience and exchanges, and sharing of experiences associated with travel and communication among people from varied locales and backgrounds. These are often cited as significant advantages of a developed recreation and travel industry. Undoubtedly, there is much to this. Nations can indeed be strengthened by this kind of exchange, and populations can greatly benefit from travel within their own country as well as in others.

However, there are social disadvantages to large-scale visitor development as well, particularly for the residents of the communities being visited. Some of the extremes often written about are the small foreign areas besieged by hordes of visitors who interact little in a constructive way with local populations and who travel about in what Erik Cohen describes as a mass tourism environmental cocoon staying in the familiar surroundings of standardized facilities and visiting local sights and cultures via the window of a tour bus.[6] This may be becoming a more appropriate characterization of the difficulties imposed upon local communities by development of recreation and tourist resources. Not all interactions are mutually desirable, and conflicts and resentment are not unknown. A particular concern to many is the degree of servile employment accompanying such development.

The overcrowding, discomfort, and disarray imposed on local people and the strain on resources are surely costs. And it is being realized more and more that these are not being shared in the same proportions as the economic gains to the community generated by visitor spending.

One type of cost that seems particularly troublesome with respect to increased visitor flows to recreation developments has to do with the congestion and depriving of the use of what are viewed as local resources by indigenous people as a result of the use by outsiders. In Washington, D.C., for example, local residents rarely venture about the major attractions in the area during tourist season, save to squire visiting relatives. And residents of British Columbia cannot travel between Vancouver Island and the mainland without incurring 3 and 4 hour waits for ferries throughout the summer months and they find picnic areas and natural facilities severely crowded by out-of-province visitors. This sharing is viewed as a cost, and increasingly it is becoming one of greater importance to local residents. Another instance involves the growing resistance in some areas to increases in the number of non-local hunters and fishermen who are seen to exploit local natural resources of game and fish to the direct detriment of local sportsmen. In many communities, this is becoming a very serious concern and in all likelihood will grow.

Another social impact of increasing recreational development is brought about by the increasing homogeneity of tourist attractions and recreational areas across different regions as current practice tends toward the same types and even designs of facilities and accommodations, and one recreational area tends to look very much like another. There is a loss here to the extent that regional and area diversity is something worth

[6] Erik Cohen, Toward a sociology of international tourism, Social Research, Spring, 1972, p 164–81.

preserving and increased recreation development and tourism, to the extent that it leads to uniformity and similarity, becomes a cost to the community at large.

A somewhat less related phenomenon, but one which seems destined to increase in the future as travel and use of recreation areas grow, is the tour. The private costs and benefits of tour operation seem certain to assure continuation of the current trend—they offer cheaper services and, by achieving some economies of scale, profit for the vendors. This will offer some favorable social impacts as it permits some segments of the population—particularly older-and sometimes poorer-groups—to enjoy the benefits of travel and recreation to a greater extent than they would otherwise.

However, to local residents and to other visitors, their impacts can be of somewhat less charm. The busloads discharged into the crowded lunch room, the megaphone of the tour guide explaining the amenity of the serene natural landscape, the creation of a conscious presence of a large block of people, and the cancellation of confirmed reservations cannot be totally ignored.

Social impacts seem neglected in planning, ... are surely another aspect to recreational ...elopment.

Impacts and Development

here are then at least these several dimensions ...the impacts of recreation development on a ...munity or region. And it would seem that ...has some importance in considering plans ...regional betterment.

...ne implication would appear to be that we ... beyond the single category or dimension of ...nditure impact in appraising the desirability ...rojects to further regional goals. Recreational ...lopment can be of great benefit to local ..., and this in itself might be sufficient justi...n for this use of resources. However, most ...sions of the use of recreation development ...tool for regional economic development are ...ngly more concerned with impacts of visitor ...ing on the local economy. Consequently, ...past tourism or recreational planning, or ...has charitably pas...d for recreation and ...n planning as a t... in development, has ...d largely upon the ...ests of the industry ...the motels, restau..., service tations, ...oncessionaires—and ...pon the number of visitors, dollars spent, and jobs created. The main rule which results from this is that anything which produces greater numbers of visitors and greater expenditures is considered good, and the planning concern reduced to simply measuring the size of the impact among alternatives.

The direct economic impact of expenditures of visitors is still a major concern, but it is no longer sufficient to regard it as the only one; too many people in too many communities regard this as too simplistic and no longer adequate.

We need to be concerned with expenditures and local multipliers and economic impact on a community, but we also need to be concerned with the incidence of these impacts; with the effects on other social values; the effects on the visitor, that is, visitor satisfaction; and with the impacts or consequences for the quality of the natural resources. The aim really is in a sense to try to increase the social welfare of all of those concerned, and while economic betterment is a large part of this problem, it is by no means the whole of it.

It is increasingly the experience and view of many that [more] people are no longer as easily swayed by the alleged betterment that will come to them as individuals and to their families and the future of their communities from large increases in recreation-tourist visitors. But the views of different communities of the trade-offs will vary among regions. A more prosperous area may not feel greatly benefited by recreation and tourism increases, while a less well off community might value these more highly. However, consensus is not made easier by the varied impacts perceived by different individuals within any community.

There is much we can do better than in the past in terms of development that lessens the conflicts between goals, policies that result in more equitable sharing of gains and costs, and in methods of assessing the varied impacts of recreational developments and choosing among them. On the latter point, many would be moved to agree with Taylor and Doctoroff that "it is clear that our methods of weighing the benefits and true costs of tourism have been far from adequate." [7] There appear to be significant gains to improving on this record.

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[7] Gordon D. Taylor and Mark Doctoroff, An approach to an integrated system for a national tourism office, a paper presented to: Seminar on Tourism Forecasts and Tourism and the Balance of Payments, United Kingdom, Sept. 1974, p. 2.

LEISURE ENVIRONMENTS OF TOMORROW

George H. Moeller, Elwood L. Shafer, and Russell L. Getty[1]

Abstract

As an aid to policy and decisionmaking about future environmental problems, a panel of experts was asked to predict the probabilities of future events associated with natural resource management, wildland-recreation management, environmental pollution, population-workforce-leisure, and urban environment. Though some of the predictions projected to the year 2050 may sound fantastic now, the authors think that some of the events predicted may occur even sooner than forecast.

To grow—indeed, to survive—a democratically based, technology-oriented society must anticipate and avoid changes that will detrimentally affect its basic life-support systems: soil, water, air, flora, and fauna. Otherwise, that society is on a collision course with extinction. Furthermore, the faster that changes occur within man-environment systems, the more critical it becomes to search the future so as to adjust present policies and programs for coping adequately with future environmental problems.

By searching out the prospects of what tomorrow's environments are likely to be, we can provide direction and scope to new policies that will insure a desirable future, in which man can live in harmony with nature.

The time-honored way to deal with change has been to take it as it comes, and then measure its impact. But under today's conditions of rapid change, the time available for such evaluation has decreased. Scientists have started to develop methods for investigating the future that do not require the future to merge with the present before action programs can be developed.

That is the purpose of this paper—to probe the unexplored territory that lies ahead in our path to the future, and to forecast those times when relevant technological, social, ecological, and institutional changes are likely to occur. Based on a survey of experts' opinions, median dates and interquartile ranges are forecast for 125 future events cataloged into one of the following five categories: natural resource management, wildland recreation management, environmental pollution, population-workforce-leisure, and urban environments. Information is intended to stimulate the thinking of decisionmakers in these five broad categories and to provide direction for formulating policies to deal with future environmental problems.

Although we are seeking to forecast important future environmental conditions, this study is not a crystal-ball undertaking. Other writers have suggested what man's condition will be in 1985 (*6*, *4*); in the next 20 years (*5*); at the end of the twentieth century (*8*); or even 100 to 1,000 years from now (*7*).

Our projections can be doubted, and we hope readers will vigorously debate them. The more people who begin to think seriously about where we are headed, the better. We invite readers to comment about the events we discuss here, and to offer their own ideas.

Study Description

The Delphi Technique

Although we are seeking to forecast important future environmental conditions, this is not a crystal-ball undertaking. The forecasting strategy used in this study is known as the Delphi Technique (*2*). In ancient Greece, when one sought knowledge of the future, he consulted the Oracle of Delphi; today he consults the experts to determine what events are likely to occur in a given field. The technique derives its importance from the realization that projections of future events, on which public policy decisions must rely, are based largely on the personal insight of informed individuals rather than on predictions derived from well-established current theory.

Helmer and Rescher (*3*) have described the philosophical basis of the Delphi technique as the

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[1] Respectively, project leader, Forest Service, Northeastern Forest Experiment Station stationed at Syracuse, N.Y.; formerly director, Pinchot Institute for Environmental Forestry Research, Forest Service, U.S. Department of Agriculture, Upper Darby, Pa. and currently principal recreation staff scientist, Forest Environment Research, Forest Service, Washington, D.C.; and Chairman, Department of Forest Policy, State University of New York, College of Environmental Science and Forestry, Syracuse, N.Y.

event. In responding to each round-three event, each panel member was asked to consider:

1. His round-two responses in light of the response distributions of all other panel members,
2. Changing his round-two estimates if he cared to,
3. And, if his round-three estimates fell outside the graphed interquartile range for any given event, justifying his response.

Round Four

Round four was similar to round three—the same summary information was provided—but in addition, major arguments presented in round three were summarized by event. Panel members were asked to consider these arguments in arriving at their final decisions as to when each event was likely to occur.

Results were summarized at the end of round four. Through successive rounds, the distributions of responses around the median-year prediction were continually reduced. In some cases, the median changed. Throughout all four rounds, if a panel member failed to respond to a questionnaire, he was dropped from the panel.

Results

Events contained in the Delphi questionnaire are grouped into five categories: natural-resource management, wildland-recreation management, environmental pollution, population-workforce-leisure, and urban environments. Figures 1 through 5 summarize events in each category.

For each event, a horizontal bar is used to describe the interquartile range of panel predictions. The median prediction is represented by the peak of each bar. The length of the interquartile bars indicates the degree of consensus among experts. In discussing results, we will limit our comments to median prediction dates.

For example, the first event described in figure 1 is: economic incentives to encourage private citizens to manage their land for fish and wildlife. The median year predicted for the event was 1980; that is, half the experts who responded to the event felt it would occur in or before 1980, and half felt it would either occur in 1980, after 1980, or would never occur. The interquartile range, containing half of the panel member predictions, extends from 1975 to 1990. One-fourth of the panel members felt that the event would occur before 1975, and one-fourth felt that it would either occur after 1990, or would never occur.

Natural-Resource Management (figure 1)

In the discussion that follows, the numbers in parentheses refer to events in the figures. Most panel members predicted a rapidly expanding governmental role in natural-resources management. The 1980 economic incentives offered private landowners who manage for fish and wildlife (1) will broaden by 1985 to include tax incentives for providing scenic amenities (2).

The Federal role in coordinating natural resource planning will expand from establishing the first land, water, and air-use plan in 1990 (3) to a national land-use zoning policy in 2000 (4). By 2000, environmental planning will be effectively coordinated between all levels of Government and private enterprise (6). Also by 2000, land-use patterns will stabilize, with land preempted for one use being replaced with comparable land (5). All natural resources, including marine and estuarine areas (7), will be under intensive management. Growing demand for electrical power will require rationing according to a national priority system by the year 2030 (8).

Although panel members disagreed about the exact year, most foresaw continuing expansion in national and international planning and control of natural resources after 2050 (11). A national per-capita land requirement will be established after 2050 (9). Growing demands, particularly for recreation resources, will require that natural resources be used more intensively. Heating of manmade lakes to allow year-round recreation (10) and public control of shoreline along all navigable water (12) will occur after 2050. Because of a dwindling resource base, public agencies will operate most resource-based recreation facilities (13).

Although most panel members agreed that Government will play an increasingly important role in natural-resource management and planning, they felt that control over use of privately owned resources will always remain with private owners (14, 16). They also felt that construction of new highways will never cease (15).

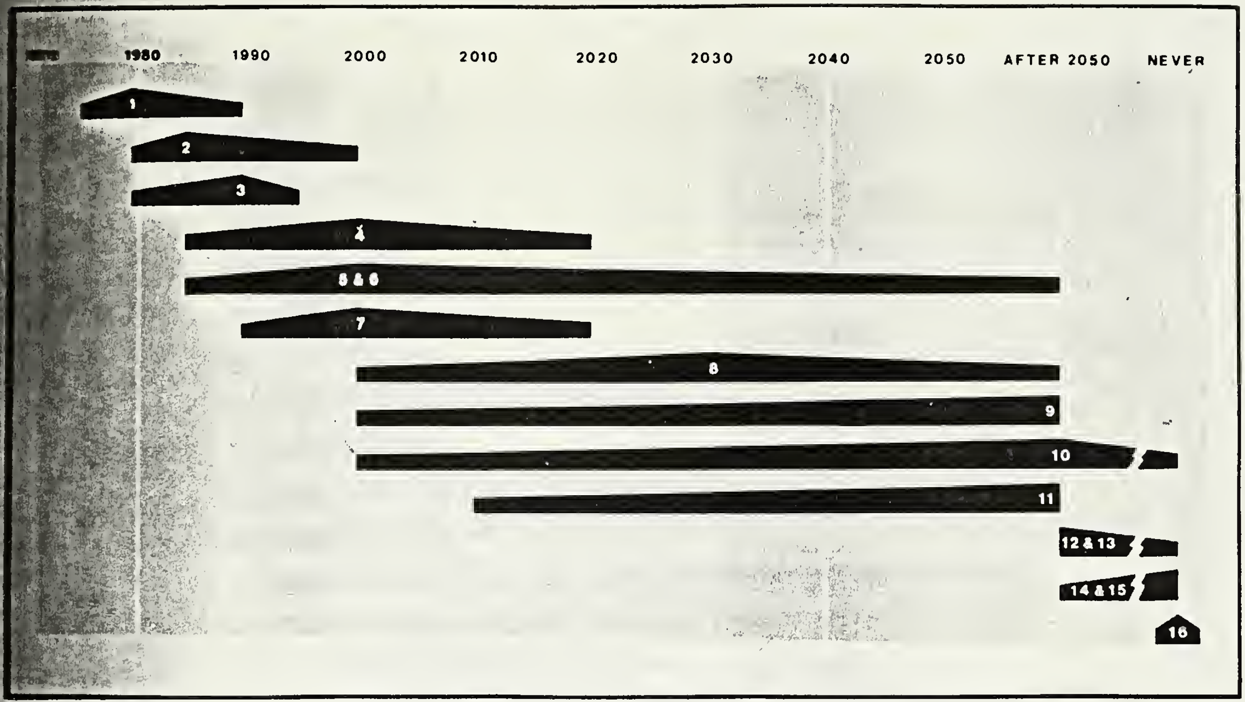

FIGURE 1.—Consensus of panel on natural-resource management (medians and interquartiles)

Wildland-Recreation Management (figure 2)

Expert opinions reflect an increasingly important role of recreation in influencing wildland management and policy. By 1980, restrictions will start on recreational use of wildland areas. Glass containers will be prohibited from wildland recreation areas (5), and use of all off-road recreational vehicles will be restricted to designated areas (3). To expand the use of scarce resources, recreation activities in an area will be assigned time periods (1). Computers will be used to advise recreationists on where to go for recreation (4), and information and education efforts will be expanded to improve the quality of recreation experiences (2).

Restrictions on recreation use will also be expanded to maintain the quality of recreation experiences. By 1985, restrictions will be placed on the number of people allowed to use a wilderness or remote area at one time (10). Maximum noise levels will be established to maintain the quality of recreation experiences and environments (6). The recreation experience itself will change, with facilities such as cable TV hookups available at most campgrounds (9); and acceptable restrictive management techniques will be employed to control recreation use patterns (7). Also by 1985, economic incentives will be available to private landowners who open their land for public recreation (8).

Increasing recreation pressure will require additional restrictions on recreational use of wildland resources by 1990. Restrictive management techniques will be used to reinforce heavily used recreation areas and to direct use patterns (14). Public recreation areas will be assigned maximum carrying capacities, and use will be kept at or below capacity levels (12). Recreation use of developed public facilities will be by reservation only (16). Maximum recreational boat motor sizes will be set for public water bodies to alleviate use pressures and to prevent environmental degradation (15). Fishermen will pay for the use of salt-water fish resources (11).

Growing recreation demands on wildland resources will require that increasing controls be placed on use of recreational resources. By 2000, wilderness-area management philosophy will, by necessity, change to more intensive management to maintain the wilderness environment (17). Permits, used to control all resource-based recrea-

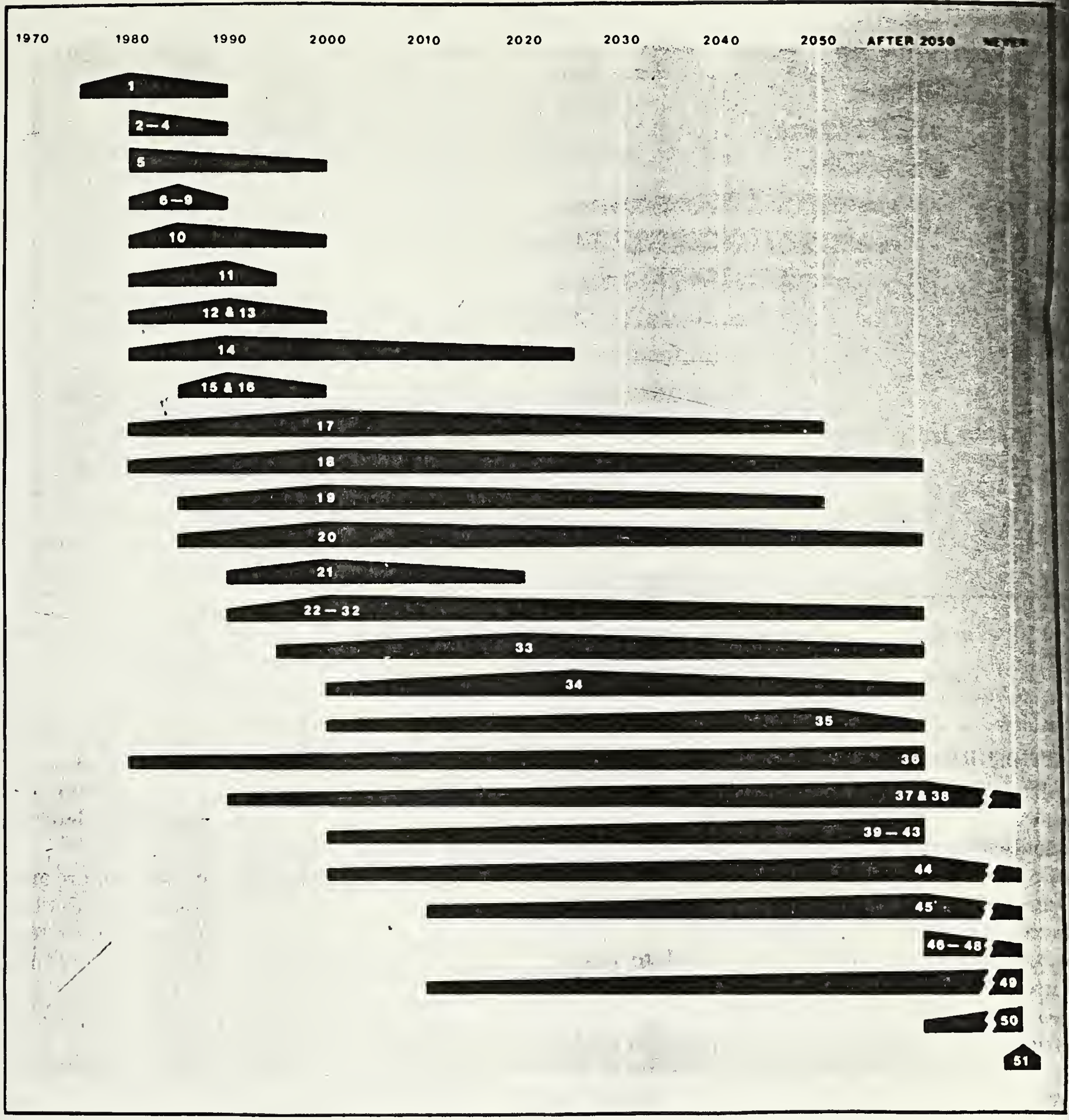

FIGURE 2.—Consensus of panel on wildland-recreation management (medians and interquartiles)

tion (27), will also include certification for certain user groups, such as wilderness users (23).

Wildland recreation areas of 2000 will be vastly different from those of today. Only travel systems that have a minimum physical and visual impact on park environments will be allowed (22). Only recreation vehicles that employ non-polluting propulsion systems will be admitted into recreation areas (21). Popular wildland recreation areas will be serviced by air (24). Park environments will be esthetically improved by underground placement of all utility lines (25).

Technology will assist the park manager of 2000, as well as create new management problems for him. Artificial lighting will extend use of resources well into the night (31), and remote

sensing devices will be used to monitor park use (18). Waste-disposing bacteria, incorporated into recreational equipment, will reduce sanitary disposal problems (26). Extensive irrigation of arid regions will broaden and enhance recreational opportunities (32). Technology will also create recreation equipment that will provide challenging management problems. For example, experts felt that by 2000, small private submarines will be in common use (29).

Rather than rely on natural reproduction, the wildlife manager of 2000 will utilize captive rearing to raise endangered species for release into the wild (19). He will monitor wildlife migrations by satellite to assist in developing management programs (20). Controls will be placed on hunting; motorized vehicles will be excluded from hunting areas during hunting season (30). But by 2000, the primary use of wildlife resources will change from hunting to non-consumptive uses like photography and observation (28).

Although the picture drawn by our panel of experts beyond the year 2000 becomes quite hazy, trends in events to that time appear to continue into the 21st century. Dwindling open land for recreation will require that by 2020 islands be constructed for recreation space (33). The last acre of wilderness, as currently defined, will be designated in 2050 (35). Wildlife resources will be much more intensively managed, at least half the States permanently revoking licenses of fish-and-game-law violators (34).

Although experts were not specifically asked to forecast events far into the 21st century, they named many events that they felt would occur sometime after 2050. Most experts felt that, beyond 2050, wilderness-area management philosophy will by necessity change to include management for intensive recreation activities, and wilderness aspects will be reduced in importance (36). In fact, land will start to be withdrawn from wilderness designation (38). Foot travel will be the only form of transportation allowed within major parks (37).

Technology will have a strong impact on wildland-recreation management after 2050. New recreation equipment—hover-craft (40), jet-powered backpacks (41), and one-man helicopters (44)—will be in common use for recreation purposes. Self-contained underwater resorts (39) and rivers constructed for recreation (47) will add significantly to the available supply of recreation resources. A few panel members felt that sometime after 2050 the first park will be in operation on the moon (48). Back on earth, robots will assist the park manager in park maintenance and public-information programs (43).

Some panelists felt that user fees at public recreation areas will eventually be set to cover all costs of providing recreation (49), that public areas will be open only for daytime use (50), and that the public will be allowed to use all rural lands for recreation, regardless of ownership (51). However, most experts felt that these events would never occur.

Environmental Pollution (figure 3)

Experts showed remarkable agreement on the years in which they felt major events related to environmental pollution would occur. Most felt that by 1980 tax credits will be offered to industries that practice pollution control (1). By 1990, however, pollution standards will be strongly enforced, and companies that do not comply with pollution standards will be closed (7).

Concern for landscape esthetics will lead to half the States passing legislation to control outdoor advertising by 1985 (3). Also, by that year, effective controls will be placed on auto and air exhaust emissions (4). Consumer products that have adverse environmental effects will be banned from production (5).

By 1990, environmental data, collected through a nationwide monitoring system, will be used to accurately simulate the effects of pollutants (8, 2). Consumers will accept the major costs of effective pollution control (6). By 1995, most commercial products will be packaged in discardable containers that do not pollute the environment (9).

By 2000, strict pollution controls will be established on both the domestic and international scenes. An international agency will be organized to halt further air and water pollution (10, 11). Although predictions varied considerably among panel members, other agents predicted for the turn of the century include: setting exact tolerance limits for various pollutants (12), allowing only biodegradable chemicals to be discharged directly into the environment (14), and disallowing Federal reserve chartered banks to finance companies that are known to pollute the environment (13).

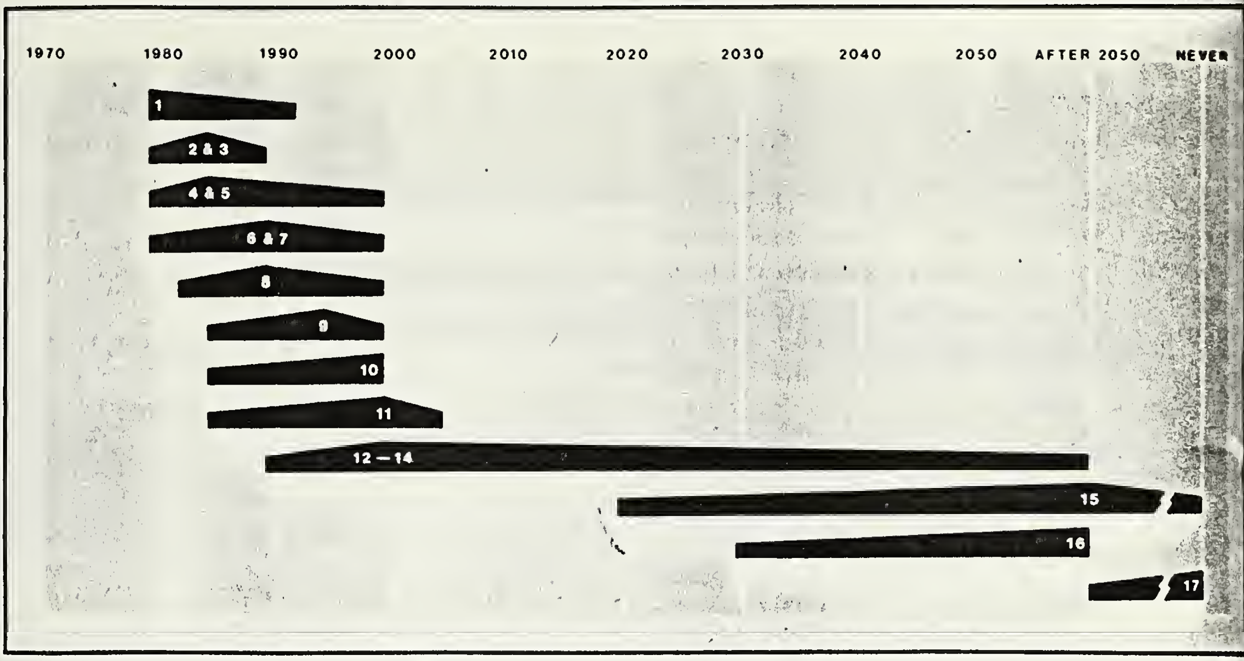

FIGURE 3.—Consensus of panel on environmental pollution (medians and interquartiles)

Although panel members felt that most waste products will be recycled (16) and that lakes and rivers will be purified to their 1800 level (15), panel consensus was that these events would not occur until after 2050. Only one out of three experts felt that political boundaries will ever be realigned to coincide with natural ecological boundaries (17).

Population-Workforce-Leisure (figure 4)

A growing population with changing attitudes toward leisure will have a major impact on institutional and social structures in the years ahead. By 1985, experts predicted an average 4-day, 34-hour work week (2). Employers will provide a leisure consulting service for their employees (1). Data on leisure activities and interests will become a regular part of the U.S. Population Census by 1990 (4). In response to increased travel and changing leisure interests, public schools will operate continually, with staggered vacation periods throughout the year (3). Most homes will be equipped with video tape systems for entertainment and education (5).

Panel members disagreed about many of the events with a median prediction year of 2000. But predictions indicate that 500 miles will be a reasonable one-way distance for the average family to travel on a weekend (7). In the year 2000 tax incentives will be offered to employers who include employee recreation facilities in the design and construction of new plant facilities (6).

Both the structure of leisure and social attitude toward leisure will change substantially by the year 2000. "Weekends" will be distributed throughout the week (9), thereby effectively increasing the supply of recreation facilities. With an average retirement age of 50 years (8), people will enjoy more total leisure during retirement. In response to abundant leisure, the role of public schools will expand to provide for recreational needs of the entire community (11). Middle-income families will vacation commonly on other continents as they vacation in the United States today (13). Panel members also felt that by the year 2000 the work ethic will assume a smaller role in governing society, and leisure will become an acceptable life style rather than a reward for work (10).

An attempt will be made to control population growth through tax incentives in 2000 (12). But panel experts felt that eventually a mandatory population-control program will be necessary (15).

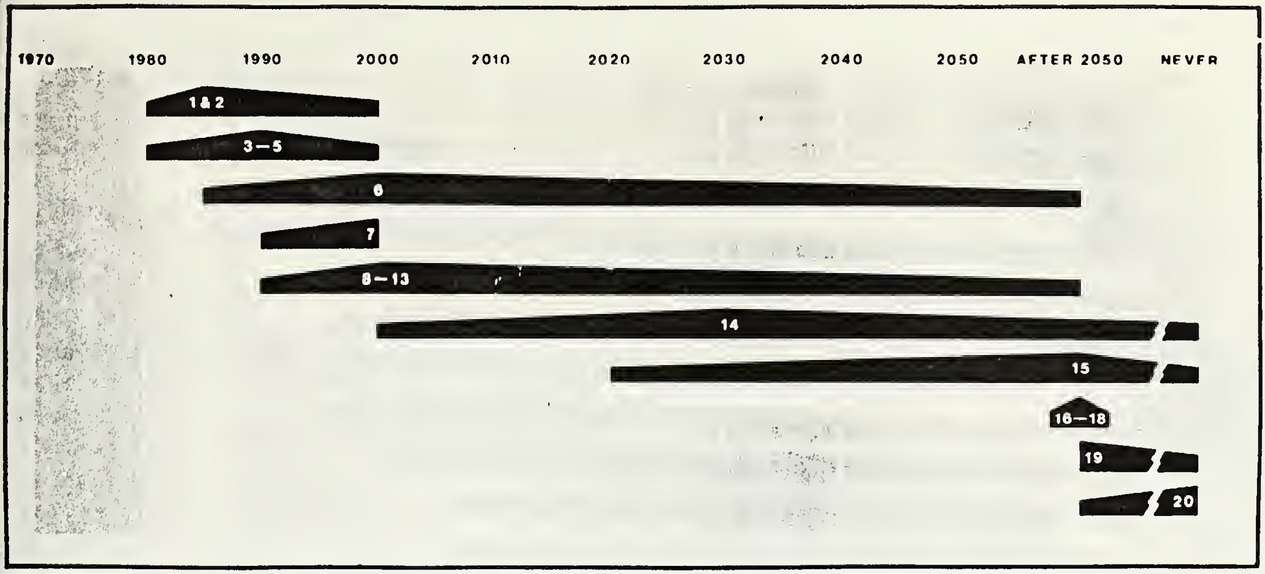

FIGURE 4.—Consensus of panel on population-workforce-leisure (medians and interquartiles)

Panel members agreed that some time after 2050, most people will have an average annual vacation of 3 months (16). They will enter the work force at an average age of 25 (19) and live to 100 years (17). Experts were about equally divided on the proportion of total work force that will eventually be required to produce all goods and services for the entire population. Half the panel felt that 20 percent of the total work force could accomplish this sometime after 2050, while others felt that this would never occur (18).

Although some panel members thought it possible, most felt that compulsory genetic measures would never be established to improve the quality of the human race (20).

Urban Environments (figure 5)

Panel members agreed that improved planning and technology will combine to make future urban environments much more enjoyable than they are today. By 1985, more emphasis will be placed on providing recreational services for specific urban population groups. For example, experts felt that special fishing areas will be established in most urban areas for the handicapped, elderly, and children (1).

By 1990, panel members predicted that private aircraft will be excluded from metropolitan airports (2). Controls on urban transportation will expand greatly by year 2000, when only non-air-polluting vehicles will be allowed in downtown urban areas (6). Computers will be used to direct and control movement of individual transportation units (10).

The urban area of 2000 will be attractive and livable. More land will be provided for leisure enjoyment; and cemeteries (3), water reservoirs (5), and added green space will be opened to recreational use (8). Leisure-serving facilities, like city parks and playfields, will be covered with artificial turf to sustain heavy recreation pressure (7), and some areas will be protected with all-weather bubbles to allow year-round use (9). Panelists even predicted that natural environments will be simulated inside man-made structures to provide urban residents with recreational opportunities now available only in the outdoors (4).

Panel members felt that by 2020, most urban areas will contain adequate recreation facilities so that the majority of urban residents will not feel the need to go outside their city for outdoor recreation (11). Recreation facilities will be developed in and near urban areas so that by 2050 even overnight camping facilities will be found within urban areas (12).

Panel members predicted a continual expansion of leisure-serving facilities beyond 2050; roofs of downtown buildings will be used as public playgrounds (13), mini-parks or play lots will be

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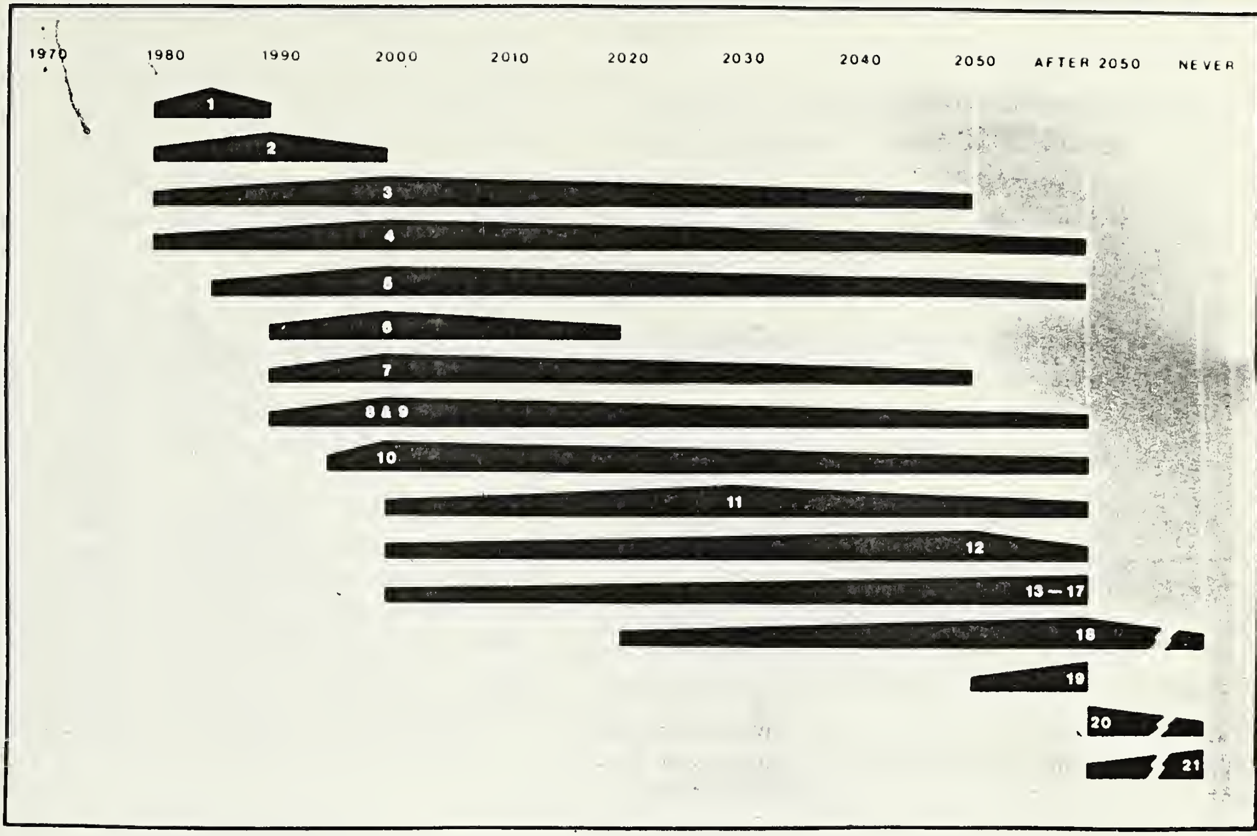

FIGURE 5.—Consensus of panel on urban environments (medians and interquartiles)

provided on each city block (16), and living structures will be designed so that they can be separated for movement to distant recreation areas (18). High-speed transit systems will eventually be available that connect major urban areas with wildland recreation areas (15). Although they predicted that 90 percent of the United States population will live in cities (17), panel experts felt that sometime after 2050 all new urban growth will be displaced to remote, relatively uninhabited regions (14). The form of urban development will change drastically after 2050, and self-contained floating cities and underwater communities will serve some new urban growth (19, 20). Although some panel members felt it would occur, most felt that transparent roofs will never be constructed to cover major cities (21).

Summary

In an era when momentous decisions about man and his environment must be made, similar attention should be given to the underlying long-term prediction process upon which all planning must be based. For example, the United States government staked 20 billion dollars on inventing a future that included placing a man on the moon by 1970. Similarly, many other potential *futures* are open to man. In this study, we have examined 125 aspects of probable man-resource futures.

Short-term forecasts—upon which many of today's man-resource decisions are based—have the advantage of being able to extrapolate from existing trends. But in many man-resource relationships, long-range forecasts are needed that consider future breakthroughs in technology that may appear and interact before a specific future event occurs. Thus, the contingencies of most futures beyond 5 years can only be assessed intuitively.

Since the use of intuitive forecasting as a basis for long-range planning is unavoidable, we have attempted to obtain this intuitive judgment as systematically as possible from persons who are recognized experts in the areas of concern—ranging from future urban environments to future wilderness-management situations.

You may feel that some of these forecasts are fantastic, unbelievable, way out. Perhaps; but consider the simple fact that man first developed the technology to fly in the early 20th century, and today he uses space ships to reach beyond his own solar system.

Jules Verne once said, "What man can imagine, man can do." We have presented here a glimpse of only a few events that experts imagine will happen in the decades ahead. If the results of past predictions of man's progress are any indication of the likelihood that the events discussed will occur, then we can only suggest that in all probability many of the events will occur sooner than later.

One of the most significant challenges facing recreation-resource planners, developers, and managers is to make decisions that insure the continued functioning of natural ecosystems, while at the same time meeting the leisure needs of society. From center-city parks to the tops of craggy wilderness peaks, recreation professionals have a vital role to play in making these decisions.

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Natural Resource Management (Explanation for figure 1)

1980

1. Economic incentives to encourage management of private land for fish and wildlife.

1985

2. Tax credit to private landowners who provide scenic amenities.

1990

3. Establishment of Federal land, water, and air use plan.

2000

4. Establishment of national land-use zoning policy
5. Replacing preempted public recreation land with comparable land.
6. Coordinated environmental planning between government and private enterprise.
7. Management of most marine and estuarine areas for fish and wildlife habitat.

2030

8. Rationing of electrical power according to national priorities.

After 2050

9. Establishment of national per-capita land requirement.
10. Heated natural and man-made lakes for swimming.
11. Viable international agreement on allocation of the world natural resources.
12. Shoreline along navigable rivers in public ownership.
13. All intensively developed recreation facilities under public management.

Never Occur

14. All water and land recreation resources under federal control.
15. Cessation of new highway construction.
16. Provision of all recreation facilities by commercial enterprise.

Wildland-Recreation Management (Explanation for figure 2)

1980

1. Allocation of specific time periods to different recreation activities for the same recreation-management area.
2. Information available about the flora, fauna, and historical features at most public recreation areas.

3. Restricted use of off-road vehicles in public recreation areas.

4. Use of computers to advise recreationists where to go for recreation.

5. Prohibiting cans and glass containers from wildland recreation areas.

1985

6. Enforced maximum noise levels in recreation areas.

7. Restrictive management procedures such as closing or altering recreational use to maintain and preserve vegetation, water quality, and wildlife, accepted by recreationists.

8. Economic incentives available to private landowners who open parts or all of their land for public recreation.

9. Cable TV available at most campgrounds.

10. Restricted use of wilderness areas to maintain or enhance the quality of a wilderness experience.

1990

11. Federal fishing licenses required of salt-water fishermen.

12. Public recreation lands assigned a carrying capacity—the maximum level of use an area can sustain without loss of natural values—and use will be kept at or below that level.

13. Year-round skiing on artificial surfaces.

14. Management techniques, such as wear-resistant footpaths, electronic guide systems, and fences to direct recreation users, accepted for managing outdoor recreation areas to allow increased use without adversely affecting the resource.

15. Restricted recreational boat-engine size on all public water bodies.

16. Camping in public areas by reservation through a national information-retrieval system.

2000

17. Wilderness-area management (includes seeding, planting, fire control, and other intensive management techniques) to maintain the wilderness environment.

18. Remote sensing devices to monitor park use.

19. Captive rearing in common use to rear endangered species for release into the wild.

20. Monitoring of animal migrations by satellite.

21. Non-polluting propulsion methods, such as electric power, to replace internal-combustion engines in recreational vehicles.

22. Travel in large parks by systems that minimize transportation effects on natural resources; for example, air transport, underground rapid transit, tramways, and cable cars.

23. Required certification of wilderness users.

24. Airstrips and helicopter pads at most popular recreation areas.

25. Underground utility lines within sight of recreation areas.

26. Incorporation of waste-disposing bacteria into recreation equipment.

27. Use of permits to control all resource-based recreation.

28. Photography and observation primary uses of wildlife resources.

29. Small private recreational submarines used as commonly as snowmobiles today.

30. Exclusion of motorized vehicles from hunting areas during hunting season.

31. Lighted resource-based recreation areas for night use.

32. Irrigation of extensive areas in arid regions to enhance recreational opportunities.

2020

33. Creation of man-made islands solely for recreation.

2025

34. Permanent revocation of licenses of fish-and-game-law violators by half of States.

2050

35. Designation of last acre of wilderness.

After 2050

36. Wilderness-management philosophy allowing more intensive recreational developments.

37. Foot travel only in major public parks.

38. First tract of land withdrawn from wilderness status.

39. Self-contained underwater resorts.

40. Hover-craft as common for recreation as the snowmobile today.

41. Jet-powered backpacks at prices accessible to middle-income families.

42. Hunting legal only on specified game lands.

43. Robots for park maintenance and public-information programs.

44. One-man, low-speed helicopters for transportation within wilderness areas.

45. Management of wildlife populations by birth-control techniques.

46. Hunting firearms utilizing laser beams.

47. Construction of rivers strictly for recreation.

48. Establishment of first park on the moon.

49. Fees at public recreation areas set to cover all capital and maintenance costs.

50. National parks and recreation lands open for daytime use only.

51. Public use of all rural land for hunting and fishing.

Environmental Pollution (Explanation for figure 3)

1980

1. Tax credits to industries that practice pollution control.

1985

2. Accurate simulation models for effects of air and water pollution.

3. Establishment of standards for outdoor advertising by half of the States.

4. Effective controls on auto and airplane exhaust emissions.

5. Federal testing for environmental impacts of all consumer products.

1990

6. Major costs of pollution control accepted by consumers.

7. Closing of companies that are not complying with pollution standards.

8. An operational nationwide environmental monitoring system.

1995

9. Commercial products packaged in non-polluting containers.

2000

10. Establishment of international agency to halt further air-water pollution.

11. Establishment of international agency to contain accidental pollution on the open sea.

12. Determination of toxic effects of pollutants and setting of tolerance limits.

13. Federal Reserve chartered banks ceasing to finance companies that pollute the environment.

14. Only biodegradable chemicals allowed to be discharged directly into the environment.

After 2050

15. Purifying of most major lakes and rivers to support the kind of aquatic life they had in 1880.

16. Most waste products recycled and utilized.

Never Occur

17. Realignment of political boundaries to coincide with natural ecological boundaries.

Population-Workforce-Leisure (Explanation for figure 4)

1985

1. Companies will consult employees on what sort of recreation activities would be best for their physical and mental health.

2. A 4-day, 32-hour work week.

1990

3. Public schools open year-round with staggered vacations.

4. A U.S. population census including questions on recreation activities and needs.

5. Video-tape systems in most homes.

2000

6. Tax incentives to employers who include recreation facilities in plants.

7. Five hundred miles reasonable one-way distance to travel for a weekend.

8. Average retirement age 50 years.

9. "Weekends" distributed throughout the week.

10. Leisure an accepted life-style.

11. Recreation needs of the entire community a function of public schools.

12. Attempt to control population through tax incentives.

13. Vacation on other continents as common for middle-class Americans as vacations in the United States today.

2030

14. Vacation homes owned by most middle-income families.

After 2050

15. Nationwide mandatory population control.

16. Three-month annual vacation for the average worker.

17. Average lifespan of 100 years.

18. Twenty percent of the available workforce producing goods and services for the entire population.

19. Average entry into the workforce at 25 years of age.

Never Occur

20. Initiation of compulsory genetic measures to improve the human race.

Urban Environments (Explanation for figure 5)

1985

1. Establishment of special fishing areas in urban areas for the handicapped, elderly, and children.

1990

2. Exclusion of small private aircraft from metropolitan airports.

2000

3. Use of cemetery land and other open land in urban areas for recreation.

4. Simulated indoor environments available to provide recreational opportunities now available only in the outdoors.

5. All water reservoirs open to public recreation.

6. Only non-air-polluting vehicles legal in urban areas.

7. Use of artificial turf for most public field sports areas and some golf courses.

8. Preservation of green space between most metropolitan areas.

9. Some city parks or parts of parks enclosed in all-weather protective bubbles.

10. Use of computers to direct and control movements of individual transportation units.

2020

11. Adequate outdoor-recreation opportunities provided by most metropolitan areas so urban residents do not feel the need to go to the country for recreation.

2050

12. "Camping" available in multi-story structures similar to parking garages.

After 2050

13. Roofs of many downtown buildings used as public playgrounds.

14. New urban growth displaced to relatively uninhabited regions.

15. High-speed public-transit systems between most urban areas and major rural recreation facilities.

16. Mini-park or play lot on most city blocks.

17. Ninety percent of the U.S. population living in urban areas.

18. Apartment structures designed to be detached and moved to recreational areas.

19. Self-contained floating cities with year-round residents.

20. Self-contained underwater cities.

Never Occur

21. Transparent roofs covering most cities.

OPEN-ACCESS RECREATIONAL RESOURCES: IS DOOMSDAY AROUND THE CORNER?

Mordechai Shechter [1]

Economists have become increasingly concerned with allocative inefficiencies associated with congestion in open-access, unique recreational resources.[2] Many have concluded that the best (and perhaps only) way to halt eventual deterioration of these resources is to impose a highly restrictive use policy. Thus, F. J. Anderson and N. C. Bonsor wrote in a recent paper, "Growing demand will ultimately eliminate the social rents that accrue to open-access resources unless population growth is arrested." And they concluded that ". . . Growing demand for the services of unique recreational resources implies a gloomy outcome under any pricing model." [3]

Are such sweeping conclusions in fact as universally applicable as we are being led to believe? Is zero population growth our only hope in the approaching apocalypse? If the picture is as black as it is painted, there is little that even the best rationing device can accomplish. The following scenario would not be improbable: The demands of a growing population mount, threatening the policies devised to protect recreational resources. Various interest groups—such as local residents who object to these restrictions—band together to repeal them. Like Joshua with his trumpets, politicians rally to their cause, and if these groups are even moderately successful, the outcome is hordes scaling the crumbled Jericho walls to complete the rapid devastation of a great number of our dwindling parks!

Then let us explore some alternative scenarios to these dire predictions. Specifically, we want to show that such conclusions follow from specific assumptions (or value judgments) concerning long-run processes, and that a modified set of assumptions could lead to different conclusions. Moreover, barring outright administrative rationing, it can be shown that in a *short-run*, dynamic context, internal rationing under an open-access policy may prove as effective (or ineffective) as an externally imposed price rationing policy in terms of preserving the natural environment and the low-density character of the recreational resources in qustion.

The Long-Run

Three assumptions lie at the heart of the "doomsday" conclusions. They are, at least

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[1] Resources for the Future, Washington, D.C. (On leave from the Technion-Israel Institute of Technology, Haifa, Israel. The author is grateful to John V. Krutilla, Lawrence Libby, and Peter H. Pearse for helpful comments on earlier versions.

[2] For example, see the seminar paper by Anthony Fisher and John V. Krutilla, Determination of Optimal Capacity of Resource-Based Recreation Facilities, *in* Natural Resources Journal, July 1972, pp. 417–44. Other papers dealing with problems of congestion in parks are: F. J. Anderson and N. C. Bonsor, Allocation, Congestion, and Valuation of Recreational Resources, *in* Land Economics, February 1974, pp. 51–7; Dan M. Bechter, Congested Parks—A Pricing Dilemma, *in* Monthly Review of the Federal Reserve Bank of Kansas City, June 1971, pp. 3–11; G. Brown, Jr., Pricing Seasonal Recreation Services, *in* Western Economics Journal, June 2971, pp. 218–25; M. Baron and M. Shechter, Simultaneous Determination of Visits to a System of Outdoor Recreation Parks With Capacity Limitations, *in* Regional and Urban Economics, November 1973, pp. 327–59; Charles J. Cicchetti and V. Kerry Smith, Congestion, Quality Deterioration, and Optimal Use: Wilderness Recreation in the Spanish Peaks Primitive Area, *in* Social Science Research, March 1972, pp. 15–30.

A comparison of these problems with the related, but not identical, ones stemming from common property and pollution is the subject of a paper by Robert H. Haveman, Common Property, Congestion, and Environmental Pollution, *in* Quarterly Journal of Economics, May 1973, pp. 278–87.

[3] Anderson and Bonsor, op. cit., p. 57. The congestion-adjusted pricing model which is presented in their paper, however, leads to the opposite conclusion, namely, that a socially optimal pricing scheme may avert disaster [see ibid., p. 54 and following page].

apparently, so widely shared that few investigators even bother to state them explicitly in their analyses. The first assumption concerns the degree of irreversibility inherent in processes which affect unique, natural recreation resources, and is pertinent when high use levels surpass the resource's ecological carrying capacity. In the presumed absence of technological know-how to recreate a ravaged resource in a humanly meaningful time-period, this assumption frequently amounts to a virtual veto over any contemplated change. Notwithstanding the eloquence with which it has been advanced, the general validity of this assumption is arguable.[4]

Technical irreversibility—our inability to restore a natural resource *exactly* to its original, pre-developed state—should be distinguished from economic irreversibility, the condition in which costs of reversal are high relative to expected benefits. The latter state includes the former as a special case involving infinite costs. The assumption of technical irreversibility introduces a high degree of inflexibility into the cost-benefit analysis, precluding alternatives which encompass even moderate changes in a low-density recreation area, such as more developed campsites or some access roads. The requirement for exact restoration, however, is justified if any of the following propositions is valid:

(a) There is an infinitely high value attached to the unknown, but potential, contribution of a threatened species to the genetic pool. (b) *Exact* preservation of present output mix is a prerequisite for *any* future recreational benefits from the preservation alternative. (c) Our concern with the welfare of posterity is such that we desire to assign an infinitely high value to the benefit of future generations from the preservation of untouched natural environments.

Commenting on the nature of such propositions, E. J. Mishan notes, "Obviously, we cannot *prove* propositions about . . . social welfare as one can prove, for example, that a significant rise in the price of beef, *ceteris paribus*, will cause a fall in the maximum amount of beef that people are willing to buy. In debating social welfare, subjective judgments are required—judgments of fact and possibly also judgments of value."[5] Once one recognizes the inevitably subjective content of those propositions, it becomes easier to agree that doomsday is not necessarily around the corner. If, under an alternative set of propositions, we admit the possibility and can show the economic desirability of converting large, low-density recreation areas into somewhat more intensively used ones, with an open option of *partial restoration*, then the ills associated with overuse might be postponed, alleviated, or removed altogether.

A second assumption concerns the tastes and preferences of future generations, as these relate to their perception of congestion and views regarding the ecological implications of changes in the intensity of resource use. Since we cannot know what they will be, we frequently assume that they are reflected in present preferences, or in discernible trends relating to them. Making such an assumption is, of course, a valid procedure. But this should not becloud the fact that we are assuming tastes and preferences of *future* generations as given by our own, and it is therefore "wrong" or "bad" to contemplate means of modifying them in order to accomodate a wider range of compromises in utilization of our natural resources. Moral judgments are inherently at stake whether we do, or do not, make explicit assumptions concerning future distributions of taste. Marc J. Roberts touched upon this problem in debating the desirability of economic growth at the cost of accompanying ecological degradation:

> *"One could argue that individual choices are often imperfect since most people have only limited time and expertise. Thus, a person's choices might well change as his tastes are developed by additional experience. Alternatively, suppose that there are grave risks of ecological disaster. Even a believer in consumer sovereignty might not want the interests of the future considered in the policy process solely*

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[4] A. C. Fisher, J. V. Krutilla, and C. J. Cicchetti, The Economics of Environmental Preservation, in American Economic Review, September 1972, p. 605-89 619. (See also a forthcoming note in the same journal by Ronald Cummings and Virgil Norton.)

[5] E. J. Mishan, Growth and antigrowth: what are the issues? *in* Andrew Weintraub, et. al., (eds.), The Economic Growth Controversy White Plains, N.Y.: International Arts and Sciences Press, 1973, p. 15.

according to the tastes and preferences of current society members." [6]

Thus, the act of converting a roadless, low-density Wilderness area into a more intensively used recreational park is not, *ipso facto*, unethical and does not necessarily imply a process of degradation. If it were known, for example, that future generations would loathe Wilderness, or consider its use taboo, then present members of society might think it wise to develop (rather than conserve) all our unique recreational resources even before the present generation of outdoorsmen and environmentalists vanishes. Furthermore, many "natural" sites around the world (Europe, Asia) which today's conservationists are fighting to preserve, actually represent man's earlier efforts to subjugate nature.

Let us then for the moment allow ourselves the freedom to engage in "amoral" fantasies about a world where future tastes and preferences are not static projections of ours. Their evolution could be self-generated or externally manipulated. Preferences can and probably will adapt to new opportunities; people might begin to appreciate things which they had previously overlooked, passed over for more preferred choices, or even resented. Witness, for example, how changes in tastes and technology combine to exploit new, "uncrowded" recreational opportunities such as seadiving, cross-country skiing, flying, and so on. Increasing costs of congestion and deterioration of the unique natural environment at recreation sites will prompt the discovery, well before doomsday, of ever newer and more varied recreational opportunities, even if for the present we discount such exotic and exciting possibilities as interstellar voyages.

Thus, several modified behavior patterns might emerge. These include a shift in preferences so that an even greater proportion of vacation time will be spent on home-oriented recreational activities (television, hobbies, and so on); increased use of high-density recreation areas such as State and local parks; or a gradual modification in the perception of solitude and the expectations from Wilderness experience. For example, a backpacking party in some Wilderness might be positively surprised if it were to encounter, say, 100 other parties on any given day rather than, say, 1,000 parties. Today, on remote trails of even the most popular Wilderness areas, it might encounter few, if any, other parties.

Unless such changes are considered morally bad, should we not explore the costs and benefits of educating elements of the population to appreciate higher-density recreation opportunities, or at least to develop a higher level of tolerance for them? Could not those groups who, for various reasons, are strongly opposed to user restrictions in low-density Wilderness areas be targeted for such re-education? The equity issue of "elitists" vs. "masses" inevitably creeps up. Low-density Wilderness options generally benefit upper socio-economic groups more than other groups.[7] The former are usually more vocal, and they certainly carry more political leverage. Should all tastes be shaped to conform to those of the so-called elitists? (Obviously, such a move toward conformity would be a self-defeating process, since it would eventually result in stronger demand pressures and worse congestion problems.) Or, consider the preferences of people like W. R. Behan. He argues that the very act of securing a permit is sufficient to dampen his Wilderness experience. He apparently prefers an open-access policy, perhaps coupled with re-education campaigns.[8] A similar attitude is to be found among residents of localities near Wilderness areas. They view use restrictions designed to maintain the low-density character of the area as impinging upon their right to free use.

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[6] Marc J. Roberts, On Reforming Economic Growth, in Daedalus, Fall 1974, p. 124. Roberts uses the example of the controversial television program "Bridget Loves Bernie," to which Orthodox rabbis objected because it presented interfaith marriage in a desirable light. He continues, "To date the society has limited the ability of any one group consciously to control the socialization process partly by refusing to admit that it occurs. But do we like the particular pattern of socialization that has come about as a result?" [ibid., p. 135].

[7] E. Mueller and G. Gurin, Participation in Outdoor Recreation, Study Report No. 20 for the Outdoor Recreation Review Commission, U.S. Government Printing Office, Washington, D.C., 1962.

[8] R. W. Behan, Police state wilderness, *in* Journal of Forestry, February 1974, pp. 98–9.

Whatever morality is invoked, however, changes will still occur. Simply consider the case in which we succeed in maintaining the quality of unique resource services by restrictive entry policies. An immediate result will be an increase in the number of potential visitors who find the expense (in time and/or money) associated with obtaining a future visit permit too high. They will naturally settle for the next best available alternative. With the passage of time, experience will inevitably reshape these people's tastes. When the children of the wilderness buff grow up, they might prefer a vacation spent in home-oriented activities to a wilderness trip. Of course, some potential visitors have little preference between a trip to a State park and a trip to a wilderness area. As far as these people are concerned, their welfare loss will be small, or nil, compared to that of the wilderness enthusiast forced to wait several seasons for his turn to visit a favorite wilderness area or national park. Yet already many Americans prefer staying home to battling weekend or holiday traffic, which is another form of recreation congestion if one includes the trip itself as part of the recreational experience. Some might begin to enjoy staying home rather than to see it as a forced choice.

A third assumption, more often spelled out, involves projections of recent demographic and socioeconomic trends well into the future.[9] Again, it is not the validity of this procedure which one ought to question, but the sensitivity of the conclusions to a different, rather plausible, set of assumptions.

It is widely accepted that the demand for resource-based outdoor recreation will continue to rise.[10] It follows that, by maintaining an open-access management policy, we will find that our ability to sustain the quality of user benefits is gradually diminishing. The outlook for the use of unique recreational resources therefore appears to be gloomy indeed. Unless we institute such management policies as price or administrative restrictions (including spatial and time use-redistribution schemes) to restrict visitors' inflow, benefits to future users will decline or disappear altogether. This happens not only because congestion can reduce social rents, but also because abused natural environments yield services of inferior quality to subsequent users. *If* the population continues to soar, *and if* we extrapolate most recent socioeconomic trends into the future, then it is indeed impossible to refute the above argument. But what about these socioeconomic factors? Must they also lead us to the same alarming conclusions?

Not necessarily. Changes in the level and distribution of income, changes in the age profile of the population, and other demographic factors may slow down or even halt the process of resource deterioration. There are indications, for example, that income elasticity of demand for a number of outdoor recreation activities declines at moderately high incomes.[11] These findings could imply that higher income groups have a wider range of substitute activities. But they also could imply that with rising incomes, high (implicit) congestion costs, and decline in product quality, more people in the future will reduce their participation in some outdoor recreation activities and seek substitute ones. There is no reason why such "feedback" checks would not operate at wilderness areas which are currently low-density as well.

Other findings suggest that the same phenomenon holds for participation rates by age. With the expectation that the trend toward a rising proportion of older citizens in the populations of developed countries will continue,[12] a resulting

[9] Projections of 30 to 50 years into the future are not uncommon. See, for example, Marion Clawson and Jack L. Knetsch, Economics of Outdoor Recreation, Johns Hopkins Press, Baltimore: 1966; Charles J. Cicchetti, Forecasting Recreation in the United States, Lexington Books, Lexington, Mass.: 1973).

[10] Clawson and Knetsch, ibid., Ch. 7.

[11] See, for example, Charles J. Cicchetti, et al., The demand and supply of outdoor recreation (New Brunswick, N.J.: Bureau of Economic Research, Rutgers—The State University, June 1969), *Ch. IV.* Using Israeli data of visits to Mt. Carmel National Park, we found above unity elasticities for low and medium income classes, [illegible] lower than unity for high income groups. These results are most relevant to areas such as national parks. The income distribution of *present* visitors to low-density wilderness areas, however, is highly skewed towards the upper middle income classes.

[12] Norman B. Ryder, The future growth of the American population, *in* Charles F. Westoff (ed.), Toward the End of Growth, Prentice-Hall, Englewood Cliffs, N.J., 1973, pp. 85–95.

decline in participation rates might more than compensate for increased use due to population growth, the rate of which is already slowing down. Of course, there are also socioeconomic forces working in other directions, such as expanding leisure time and paid vacations. But we would be well-advised to be cautious in extrapolating recent trends. In the extreme case, given a rush to develop many more outdoor recreation sites, we could even face a glut in the supply of recreational resources. One is tempted to draw an analogy with the present over-supply of higher learning institutions which resulted from wrongly extrapolating the transient demand trends of the 1950s and '60s.

A Short-Run Analysis

Let us now turn to the short term. Assume that the "conventional" form of the above three assumptions regarding the long-term adjustment processes (namely, absolute irreversibility, present distribution of preferences, and linear extrapolation of recent demographic and socioeconomic trends), *does hold,* and that it has therefore been decided to maintain a given natural area as a low-density recreation site. The standard prescription for maintaining low use-level has been some type of restrictive entry policies. These usually take the form of administrative rationing, such as imposing a limit on the number of use permits issued during peak demand periods and, quite infrequently, price rationing. Ideally, under the latter, prices set at marginal congestion costs should result in optimal use. Under an omniscient administration, the former should also yield optimal outcomes. Determining the correct user fee or figuring the optimal level of administrative rationing (the more probable approach) are certainly not easy undertakings. Administrative considerations aside, in a dynamic context, it is furthermore difficult to predict whether the loss of potential social benefits stemming from price rationing will be smaller or larger than that resulting from an open-access policy. Let us see why. In figure 1, curves Dc_i represent conditional market demand schedules, $q=D^1(p, c_i)$ in the sense that they predict the total number of visitors at different prices for a given level of anticipated crowding, c_i. Each such demand curve can be realized only at one point, where q, the total number of visitors actually coming to the park, is equal to their anticipated

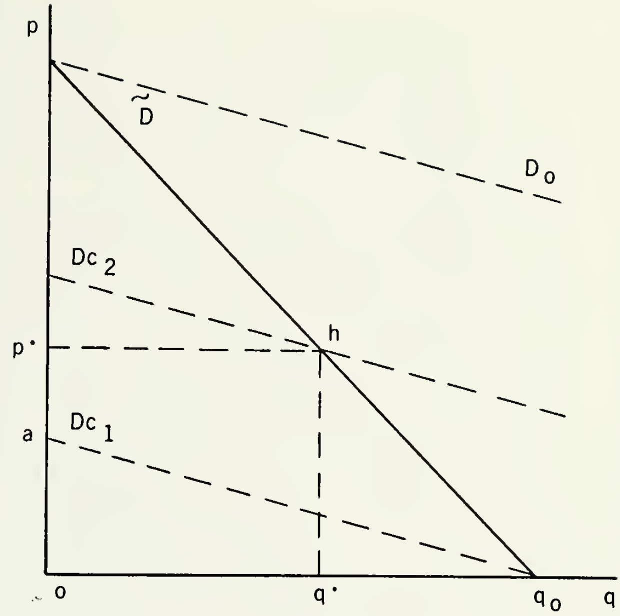

FIGURE 1.

number of visitors, c_i, i.e., $q=D^1(p, q)$. Curve D_o is marginal willingness to pay when no one else is present (absolute solitude). Curve $\tilde{D}$ is the locus of realized points on successive Dc_i curves, or the "congestion-adjusted" demand curve.[13] With price set at zero (open access) this system of Leibenstein-type, quality-adjusted set of demand curves[14] will converge to a point q_o on a congestion-adjusted demand curve, $\tilde{D}$.

One might note that social rent is not necessarily eliminated at Point q_o.[15] It is equal to

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[13] See Haveman, op. cit., p. 283. He refers to it as the "observable" marginal total-willingness-to-pay function. Point q_0 represents his case of "self-limiting" resource misallocation and welfare loss.

[14] See Harvey Leibenstein, Bandwagon, snob, and veblen effects in the theory of consumer demand, *in* Quarterly Journal of Economics, May 1950, p. 183-207. In this paper, he analyzes the operation of "snob-effect" externalities on market demand. Fisher and Krutilla, op. cit., used an analogous construction to analyze the effect of crowding on the recreational experience. The similarity between these two approaches has been pointed out by Anderson and Bonsor, op. cit.

[15] Contrary to the opinion of Anderson and Bonsor, op. cit., p. 55. Their conclusion could have resulted from an implicit assumption about the homogeneity of the user population.

the area aoq_0, which would of course be smaller than the rent associated with point q^*, corresponding to maximum benefits for a perfect price-discriminating, congestion-aware owner (that is, aware of $\tilde{D}$). The zero rent conclusion holds if one assumes that potential users are distributed bimodally with respect to their preferences for solitude, and that restrictions would have operated to allocate the recreational resources only for the purists among them (not unlike the allocation of facilities among members of a country club). In that case, an open-access policy might result in a larger number of visitors from the non-wilderness-oriented group, which could potentially drive the first group's benefits to zero, or below. This is analogous to Haveman's pollution-externality case,[16] while that depicted in figure 1 corresponds to his congestion-externality case.

In a dynamic framework, points q_o and q^* can be regarded as points of convergence within a cobweb mechanism. Thus, at zero prices, visits might tend to oscillate around, rather than converge at, point q_o. This phenomenon may result, for instance, from information lags. Depending upon the extent and severity of such lags, the oscillatory interval might also include the efficiency point q^*. Conversely, at p^* the range of oscillations might encompass q_o, the open-access point. Let us illustrate this "strange" result first for the case of open-access, unregulated system, and second for the controlled access (via price rationing), regulated system.

An unregulated system

In figure 2, we assume that an open-access policy is in effect and that recreationists expect the level of crowding to be $c_2=q_2$; their conditional demand curve is Dc_2. At zero price, if all behave identically, the *realized* number of visitors would be q_1, not q_2. Hence, they actually encounter a corresponding level of crowding $c_1 \geq c_2$. Subsequently, the expectations for their next trip would tend to follow Dc_1 rather than Dc_2. But then they would discover that, *ex post*, total visits drop to q_2 (again, at zero price). Because of the manner the relevant demand curves were drawn, and in the absence of learning, the visitors, in the next trip, would again follow the Dc_2 function, and so on. This is the case of "perfect oscillation." It could result either in *unexpected* net benefits or in *unexpected* net losses. Depending on the relative slopes,[17] other patterns might emerge.

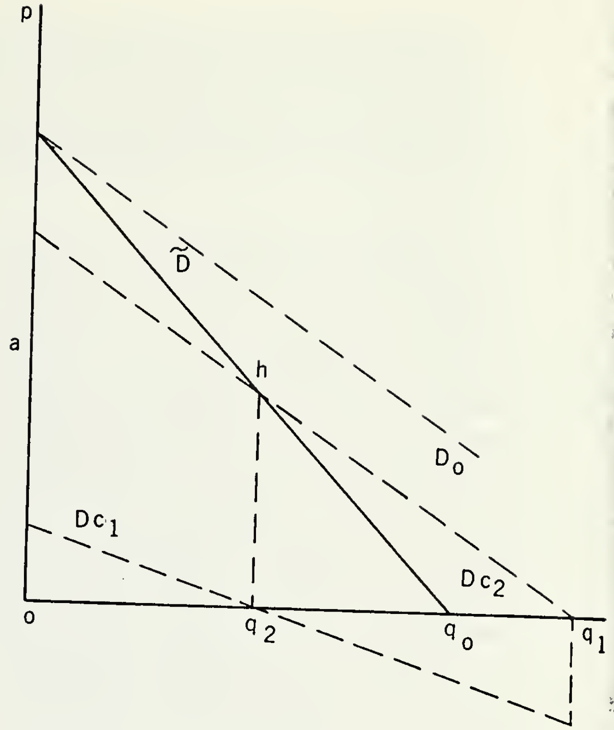

FIGURE 2.

Presumably, if we allow for learning, eventually they would hopefully learn what is the true demand curve, $\tilde{D}$, and the system might stablize at q_2.[18]

A regulated system

Let us now take a case of price rationing. Assume in figure 3 that the optimal price is p^*. Assume that the recreationists initally expect the level of crowding to be q_2. But in following the

[16] Op. cit., p. 285.

[17] Borrowing the terminology used by Anderson and Bonsor, op. cit., p. 54, these curves could be characterized as being separable or nonseparable. A separable function, $F(q, c)=h(q)+g(c)$, will result in a series of parallel demand functions such as Dc_1 and Dc_2 in figure 1. Each curve indicates a given, *expected*, level of crowding. In figure 2, the changing slopes of these curves indicate nonseparability; that is, the fact that marginal willingness to pay is a function of crowding as well as (own) number of visits.

[18] E. Devletoglow, Correct Public Prediction and the Stability of Equilibrium, *in Journal of Political Economy*, April 1961, p. 142–61.

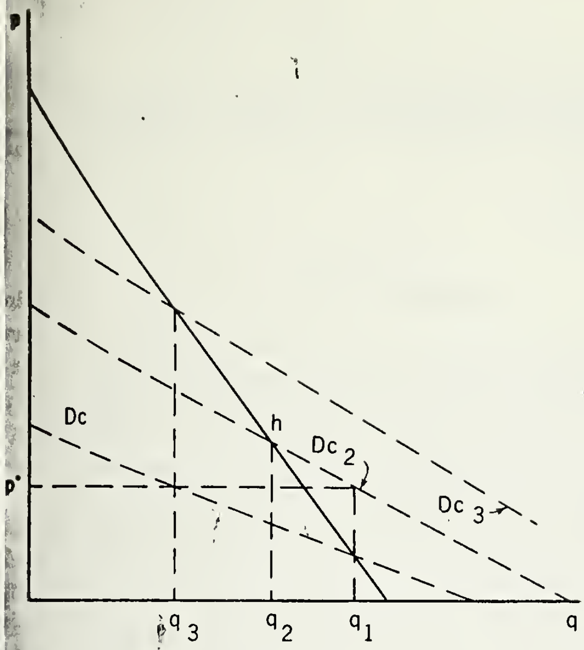

Figure 3.

conditional demand schedule Dc_2 they encounter a level of crowding c_1, corresponding to q_1. Next time around, they would therefore adjust their expectations to correspond to that level of crowding, i.e., Dc_1. But if all the visitors plan their visits (at price p*) accordingly, they would be surprised (presumably) to encounter a lower level of congestion, q_3. Subsequently—again assuming no learning behavior—on their next trip, they would further reshape their expectations and follow Dc_3, and so on. The system, therefore, tends to diverge from the optimal price. As in the previous case, the visitor population would alternately experience unexpected benefits and losses. The point is that *a priori* we cannot claim that the regulated system will of necessity outpreform—in terms of net (or mean) social benefits over time—the unregulated one. Only when the price p* initially set at h would the result be unequivocally in favor of the price-rationing policy.

The point of the foregoing—admittedly contrived—exercises is to demonstrate that in a dynamic, short-run context, a price rationing policy might not necessarily outperform open-access policy, even when the restriction is justified on long-term grounds.[19] We have, moreover, seen that long-run adjustment processes could lead to internal rationing not only because people would be forced by the circumstances to modify their choices, but also due to gradually evolving changes in the underlying preference structures governing such choices. These long-run threads, coupled with short-run internal rationing resulting from adjustments to unpriced congestion externalities, could prove quite effective in rationing use .Thus, even in cases where externally enforced rationing (i.e, price) is administratively impractical or politically unpalatable, doomsday may not necessarily wait in the wings.

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[19] This may suggest that any policy short of outright administrative rationing must be coupled with a diffused information system which will keep potential users informed of changing use patterns within and between seasons in the various parks and wilderness areas. (An example is the advanced registration procedures used in the National Park System.) The information system could prove useful in other ways as well. In cases where consumers are not homogeneous with regard to their favorite types of outdoor recreation activities, re-directing the "misinformed" group away from unique sites to other, higher-density recreational sites of equal value to them can enhance the experience of the group of people who are more disturbed by crowding at the low-density sites.

OUR CHANGING POPULATION STRUCTURE: WHAT WILL IT MEAN FOR FUTURE OUTDOOR RECREATION USE?

Thomas C. Marcin and David W. Lime [1]

Introduction

Twenty years from now, the demand for outdoor recreation resources may be quite different from what it has been over the past two decades. Demands for available resources will be influenced by dramatic shifts in demographic, social, and economic forces. An extremely important—and previously little studied—influence will be America's changing age structure. Population growth has declined markedly in the last decade, and the disporportionately large baby boom generation will be reflected in a continually aging society. Between 1973 and the end of the century, for example, the median age of our population will increase from 28 to 35 years.

The implications of our changing population structure have not been widely recognized in recreation planning. Young people have a disproportionately higher rate of participation in most outdoor recreation activities than do older people. Population growth for people under 20 years of age has stopped and will decline during the next decade. Consequently, resource managers should be particularly cautious of projecting past trends in overall recreation participation into the future, particularly for activities especially popular with youth.

Declining Population Growth

The annual population growth rate in America has declined from 1.7 percent in 1960, to 0.7 percent in 1973. This decline has resulted from the startling drop in the fertility rate in recent years. The total fertility rate, i.e., the number of children a woman will have upon completion of her childbearing years, has fallen from 3.8 in 1957, to 1.9 in 1973 (*22*) (fig. 1). What's more, the rate is still declining and may reach 1.8 in 1974 (*21*). The current rate is below the 2.1 children per woman needed to eventually stabilize the Nation's population excluding immigration.

Many demographers feel that present-day values make permanent low fertility a likely outcome for the first time in history (*6*). Childbearing is being postponed by the general availability of sophisticated birth control methods and legalized abortions. Because of present public campaigns against population growth, combined with today's uncertain economic outlook, many may try to maintain their standard of living by not having children.

Recent population projections to the year 2020 are based on four series of fertility rates designated C, D, E, and F (fig. 2) and these assume 2.8, 2.45, 2.1 and 1.8 births per woman, respectively (*24*). These series are based on common assumed mortality rates and an assumed net immigration rate of 400,000 persons annually.

Population growth has already dropped below Series E projections. Yet, Series B population projections were used in the 1970 draft of the National Recreation Plan, *The Recreation Imperative* (*25*). Series C projections were used for analysis in the recently completed report, *Outdoor Recreation in America: An Economic Analysis* (*5*).

Chiccetti (*7*) compared recreation demand in the year 2000 for population Series B (335 million people) with Series E (266 million people). He found that the demand for outdoor recreation facilities would be at least 30 percent lower, and the demand for facilities would be perhaps as much as 50 percent lower using Series E than those demands using Series B estimates. He attributed the smaller demands to aging of the population, which would have a particularly negative effect on activities avidly pursued by young people.

Changing Age Structure

Three major trends in the annual number of births during the past 50 years have shaped our

[1] Respectively, principal economist and principal geographer, North Central Forest Experiment Station, Forest Service, St. Paul, Minn.

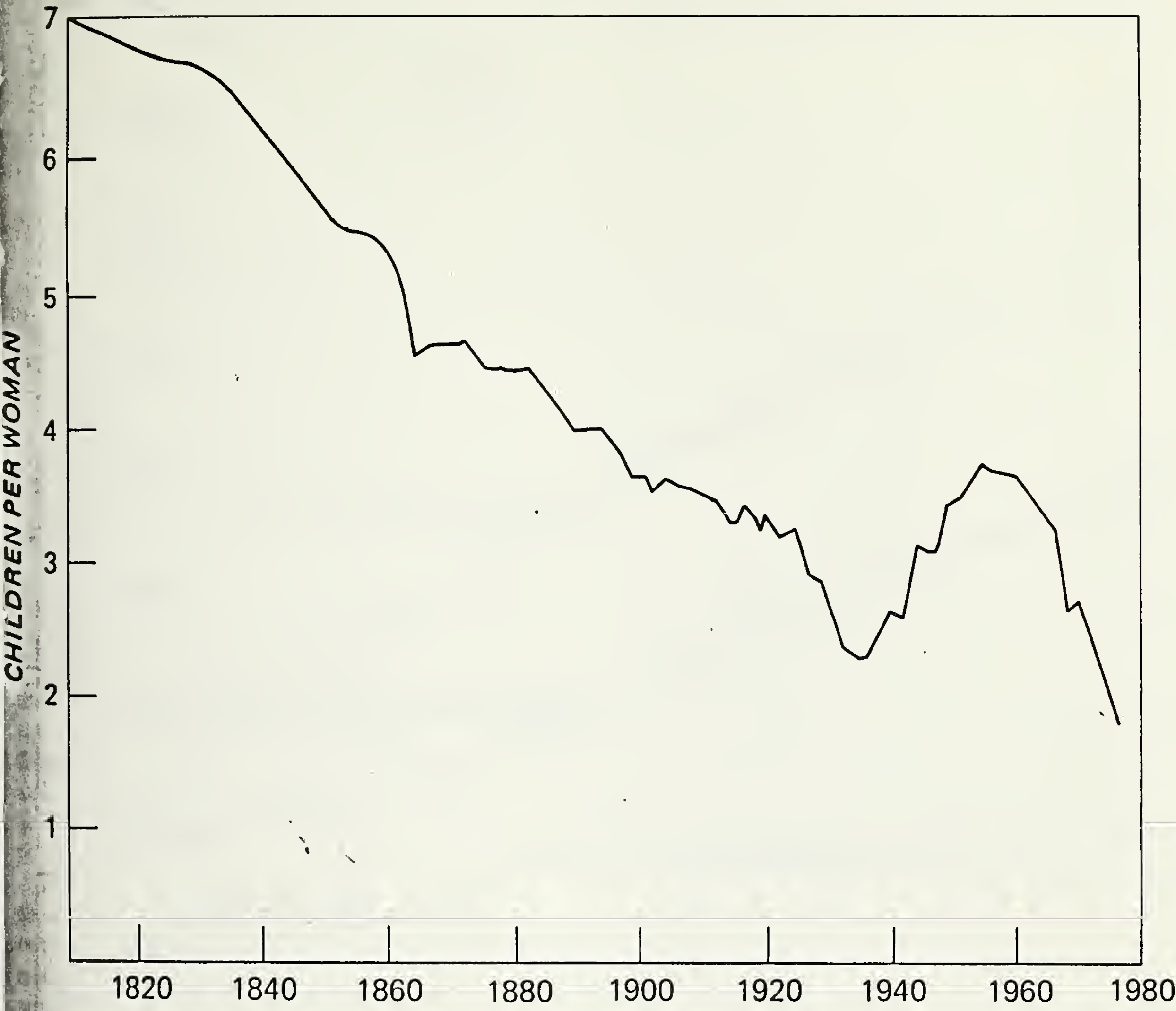

FIGURE 1.—The total fertility rate in the United States from 1800 to 1974.

present unbalanced age structure (fig. 3): (1) A decline in births from 3 million in 1925 to 2.3 million in 1933; (2) the baby boom of the 1940's and 1950's which peaked at 4.3 million births annually during 1957–1961; and, (3) the sharpest decline in the birth rate in our history following this peak of the late 1950's. In 1973, births fell to 3.1 million, the lowest level since the end of World War II. However, a rebound is predicted for the next 10 years as baby boom children reach adulthood.

Age groups will vary widely through time because of these past fluctuations (fig. 4). Population growth now is largely concentrated in the 15 to 30 age group, that is, persons born in the baby boom of the 1940's and 1950's. There are relatively fewer people in age groups representing persons born during the 1930's and after 1965. As those in today's 15 to 30 age group get older, rapid shifts will occur in our population growth. For example, the numbers of persons 25 to 44 years old will increase rapidly from 1970 to 1990, while there will be fewer persons 10 to 24 years of age. This is just the reverse of what the growth rates were during the 1950's and 1960's.

These changes in the population age structure will have an important effect on the demands of our society. In the next 50 years, the concerns

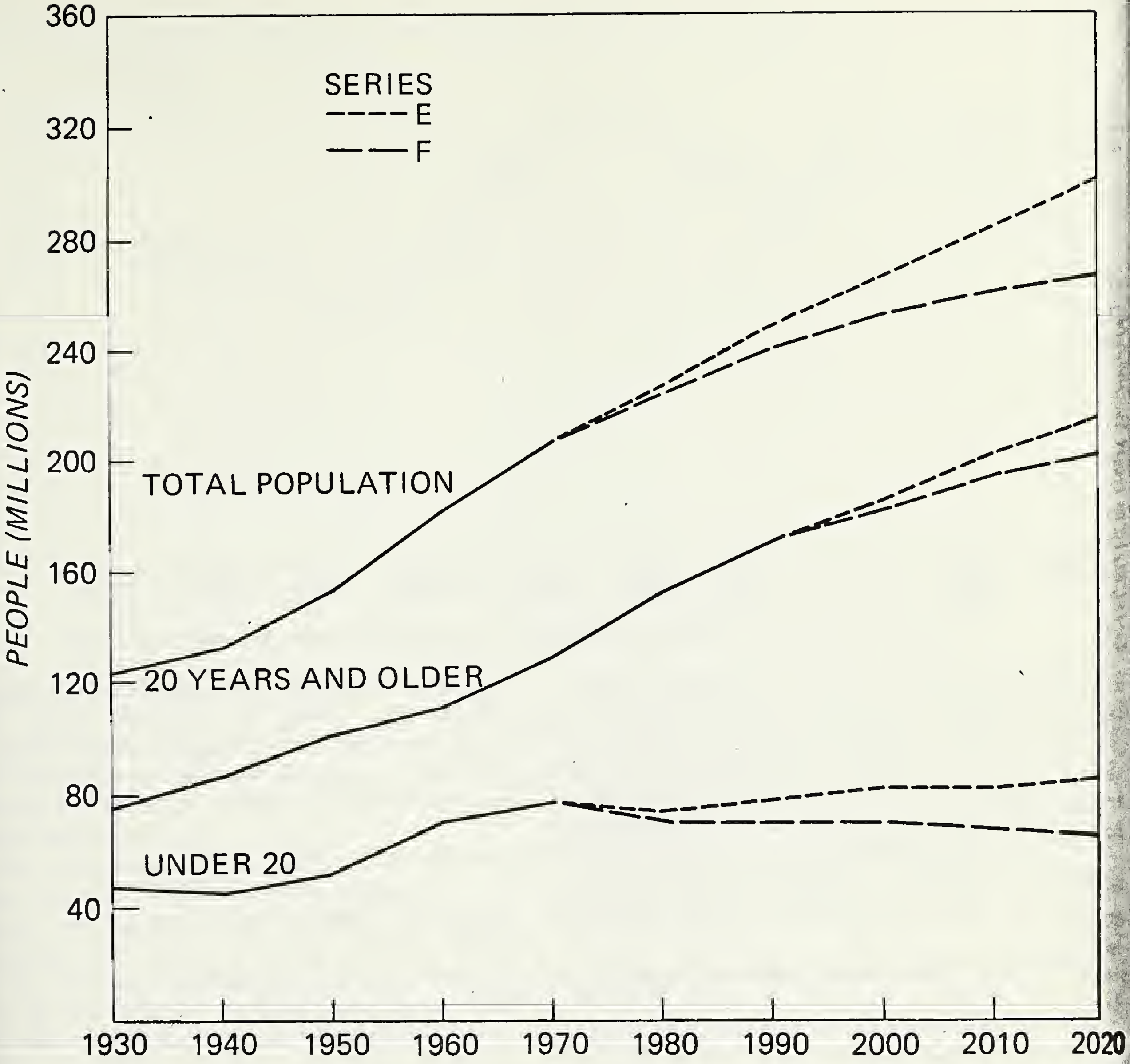

FIGURE 2.—Total U.S. population, population 20 years and older, and population under 20 for 1930, 1940, 1950, 1960, and 1970 with projections to 2020.

of youth will be replaced by those of the middle-aged, and finally, of the elderly. The needs of society—housing, social services, education, and recreation facilities—will change as the baby boom children age. Their needs, preferences, and habits will demand priority in nearly every social and economic decisions.

The 1960's brought the era of the youth cult as the baby boom generation reached adolescence. The needs and wants of this group were skillfully exploited by mass media advertisers. For example, the youth-look was fashionable in dress for older people. Organized sports boomed, and the demand for many types of outdoor recreation opportunities increased. Existing social institutions strained—sometimes cracked—under the impact of this youth cult.

Nowhere have the effects of rapid reversal in age structure been more pervasive than in our schools. First, the baby boom caused a shortage of teachers and classrooms in the early 1960's. Then this group swelled the ranks of college graduates. Now, the recent baby dearth has reduced the need for teachers, producing an

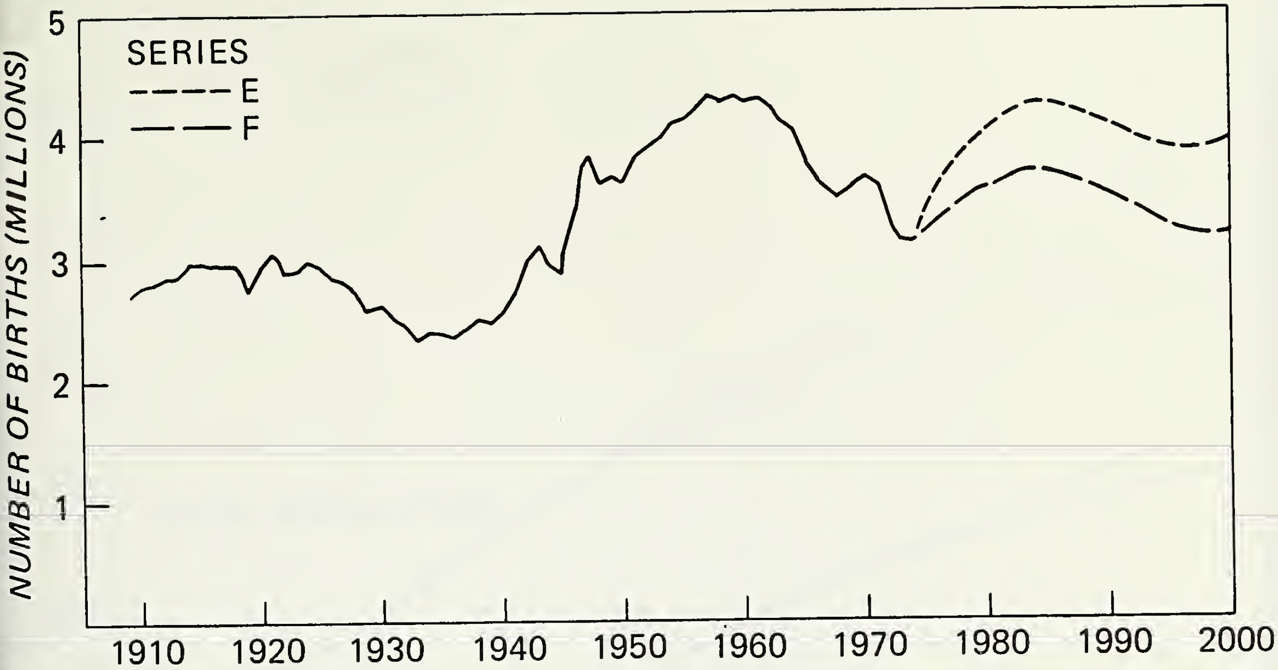

FIGURE 3.—Estimated number of births in the United States, 1909–1974 with projections to 2000.

unprecedented surplus of unemployed teachers and vacant classrooms in many communities. A similar impact is likely to be felt by our colleges and universities in the next 10 years. This crunch already has been felt in many private and some public institutions.

The current era of the young adult will continue into the 1980's. Generally, they are concerned with getting jobs, establishing homes, marrying, and having a family. They acquire homes, furniture, appliances, and cars. Usually they go into debt to purchase these items. This will add to the strain on capital markets. Meanwhile, the impact of the baby dearth will be reflected by a relative reduction in demands for goods and services catering to young children.

The mid-1980's and 1990's will usher in the era of younger middle-aged people (30 to 44) Middle-aged people typically are net savers and have increasing amounts of discretionary income. Strains on the capital markets should ease. Those having small families especially should have increased incomes to upgrade their standard of living. Demands should increase for single-family houses, expensive household goods, cars, boats, recreation vehicles, second home sites, and the like. At some time, demands will decrease for youth and young adult items—apartments, motorcycles, high school and college facilities—because of the sharp decline in births since the early 1960's.

By the year 2000, older middle-aged people (45 to 64) will begin to dominate our society. As the children of the baby boom begin to reach retirement in 2010, the demand for health services, leisure time activities, vacation retreats, and luxury goods for this segment of society should expand. There will be a general need for facilities and services for the elderly—retirement homes, nursing homes, and medical and social services.

Changing Household and Family Structure

Since 1950, the number of households has risen about 30 percent faster than population increases alone would have warranted. The trend has been toward smaller families as young adults and older people formed separate households. Consequently, the number of households headed by individuals (widows, divorcees, and other single persons) has doubled since 1960. In 1974, nearly 15 million of almost 70 million households (21 percent) were headed by one individual. The size of the average household dropped from 3.3 persons in 1960 to 3.0 persons in 1974 (*23*).

Large families of the 1950's and 1960's are gradually breaking up. New, smaller families in which women have a more active role are taking their place. A recent survey of women found that 96 percent see marriage as the preferred life style, but more than half want to combine marriage,

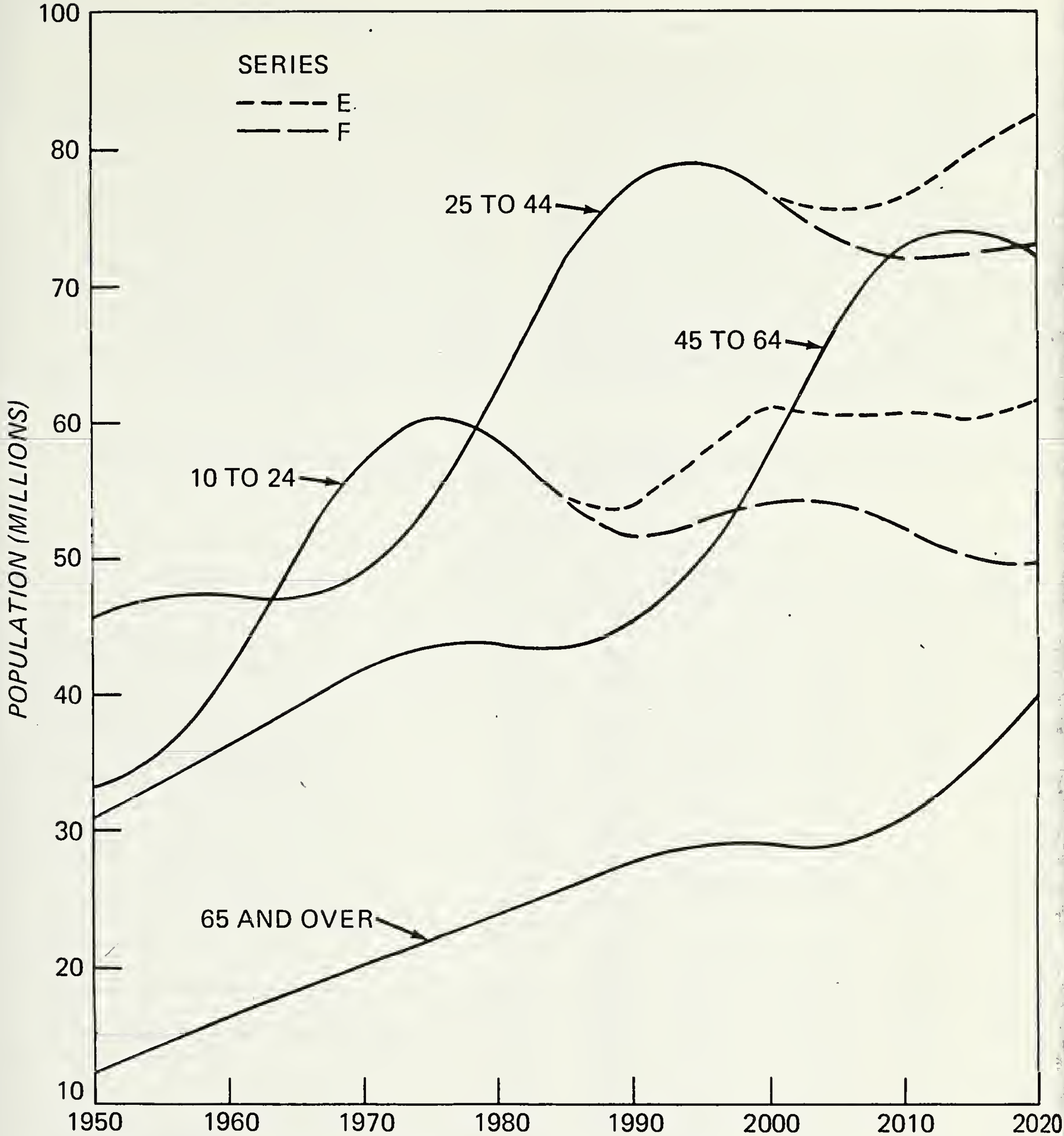

FIGURE 4.—Populations for selected age groups, 1950 to 1970 with projections to 2020.

children, and careers (*17*). This will lead to more women in the labor force. As a new generation of families emerges, social needs and structures are likely to be very different from those of their parents.

The trend toward single-generation families and fewer children per family is of particular interest in speculating about future needs for leisure time activities. More younger and older individuals will be living separately. The family is likely to be together fewer years. Couples are likely to have more time without children in their young adulthood and older middle-aged years; thus, the amount of time their activities are restricted by young children will be reduced.

Relation Of Recreation Activity To Age

Numerous studies have shown that age is closely linked to recreationists' preferences (*18, 3, 4, 5, 16*). One reason, of course, is that physical stamina is directly related to age. Age also serves as a proxy for other social and economic factors—discretionary income, family status, and the stage achieved in one's career. It also reflects the position of an individual in the social development of the country. For example, older people grew up in a different society than younger people. Obviously, other factors also influence participation in recreation activities—income, education, amount of leisure time, and life style. In addition, shortages and high cost of fuels may have a significant impact on recreation activity.

Young people have a disproportionately higher rate of participation in most outdoor recreation activities than do older people (table 1). The more strenuous activities are especially youth-oriented—water-skiing, snow skiing, horseback riding, backpacking, motorcycle riding, mountain climbing, swimming in outdoor pools, playing outdoor sports and games, etc. As people age, however, they become more selective in their preferred activities, and the percentage of people who participate within age classes declines. Of

TABLE 1.—*Population 12 and over participating in selected activities by age class during the summer quarter of 1972 and fall and winter of 1965* [1]

[In percent]

Activity	Age class					Total—all classes
	12–17	18–24	25–44	45–64	65 and over	
Attending outdoor concerts, dramas, etc	7. 6	12. 9	4. 7	6. 0	2. 5	7. 0
Attending outdoor sports events	18. 1	15. 1	12. 3	8. 6	5. 3	12. 0
Bicycling	31. 9	12. 6	7. 8	3. 9	1. 6	10. 0
Bird watching	3. 7	2. 8	4. 7	4. 6	2. 1	5. 0
Boating (other than sailing and canoeing)	19. 6	16. 7	17. 7	11. 5	3. 6	15. 0
Camping (in developed campground)	19. 2	12. 9	13. 2	7. 1	2. 4	11. 0
Camping (in remote or wilderness area)	8. 2	6. 9	6. 3	2. 4	. 3	5. 0
Canoeing	4. 4	4. 9	3. 5	1. 2	. 6	4. 0
Driving for pleasure	30. 0	44. 4	36. 1	32. 2	26. 0	34. 0
Driving 4-wheel vehicle off road	3. 4	2. 3	2. 3	. 6	. 2	2. 0
Fishing	31. 3	26. 7	28. 9	18. 3	10. 5	24. 0
Golf	4. 3	5. 8	4. 8	6. 2	1. 2	5. 0
Hiking with pack/mountain/rock climbing	12. 7	8. 4	5. 2	2. 1	. 3	5. 0
Horseback riding	15. 4	9. 8	3. 8	1. 4	. 2	5. 0
Hunting [2]	15. 0	18. 0	14. 0	9. 0	4. 0	12. 0
Nature walks to observe birds, plants, etc	23. 7	22. 5	18. 9	12. 5	5. 0	17. 0
Picknicking	49. 3	53. 5	55. 1	41. 2	24. 8	47. 0
Playing other outdoor sports (not golf and tennis)	47. 4	30. 2	24. 9	8. 6	2. 6	22. 0
Riding motorcycles off road	10. 4	8. 9	4. 5	1. 0	. 3	5. 0
Sailing	4. 2	3. 9	2. 2	2. 0	. 7	3. 0
Sightseeing	38. 9	38. 3	40. 2	38. 5	25. 6	37. 0
Swimming—outdoor pool	38. 6	23. 1	18. 2	9. 7	2. 6	18. 0
Swimming—other outdoor	56. 7	47. 0	41. 8	17. 5	4. 4	34. 0
Tennis	11. 7	10. 6	4. 5	1. 6	. 5	5. 0
Visiting zoos, fairs, amusement parks	33. 2	29. 0	29. 4	17. 0	8. 2	24. 0
Walking for pleasure	49. 5	41. 7	34. 1	27. 8	19. 0	34. 0
Water skiing	8. 1	10. 8	6. 8	1. 0	0	5. 0
Wildlife and bird photography	2. 5	2. 7	2. 3	1. 6	. 6	2. 0
Ice skating [2]	29. 0	18. 0	7. 0	2. 0	------	9. 0
Snow skiing [2]	10. 0	8. 0	3. 0	1. 0	------	4. 0
Sledding [2]	40. 0	20. 0	13. 0	2. 0	------	13. 0
Other activities	30. 1	29. 2	24. 1	21. 3	17. 4	24. 0

[1] Source: Bureau of Outdoor Recreation (*3, 5*).
[2] September—May 1965.

course, some older people continue to participate in most activities, but relatively few of them. Only seven of the 30 activities identified in table 1 were fairly evenly distributed across age classes; even these dropped markedly for the over 65 age group. Only bird-watching was engaged in by relatively more persons over 25.

It would be neither possible nor desirable to examine individual activities in relation to changes in our population structure. Although some activities are clearly youth-oriented, participation in many others is only moderately related to age and remains important in the lives of many until late middle age—fishing, sightseeing, picnicking, and walking for pleasure (table 1).

One useful way to discuss the implications of our changing age structure on participation is to consider recreation behavior in light of how activities are conceptually related or grouped. Several classifications of conceptually linked activities have been proposed (*1*, *2*, *10*, *8*).

Such typologies can be related to user characteristics. We can then speculate about the impact of a change in a major factor like age on activity preferences by considering the concept of substitutability among leisure time activities. We can even speculate about new activities or technologies that might emerge in a given activity-preference type to accommodate an older population.

The typology of activities developed by Hendee *et al.* (*10*) illustrates how a grouping of activities can be related to participation by various age classes. Their classification was based on a study of car campground and wilderness visitors in Oregon and Washington. From a list of 26 activities, respondents selected the six they liked best when they went camping. Those selected as the "most preferred" (ranked number one) were systematically grouped into five conceptually-linked categories. Each category was named according to the general type of motivation it fulfilled:

1. *Appreciative-symbolic.*—Activities are directed toward appreciation and preservation of environmental features. For example, recreationists typically would experience nature on foot or on horseback rather than from a car or train. Activities would be preferred in settings where crowding and manmade facilities were not common. These would include seeing natural scenery on foot or on horseback, rock climbing, mountain climbing, birding, nature study, and photography.

2. *Extractive-symbolic.*—Activities are characterized by the quest for "trophies" extracted from the natural environment—fishing, hunting, and rock and shell collecting.

3. *Passive free-play.*—Activities would require relatively little physical effort. The setting for them would not necessarily be natural or near-natural. Levels of use could be moderate to high. Considerable latitude would be possible for developing convenience facilities and opportunities for social interaction among participants. Activities include relaxing, sunbathing, reading, sightseeing from the car, and quiet boating or canoeing.

4. *Social learning.*—This category includes activities in which major motivation is to socialize. Because social interaction is a principal source of satisfaction, relatively high levels of use and manmade facilities often are common. A high degrèe of naturalness of the environment is not required. Two classes of activities can be identified: (1) Social activities, such as visiting with others, and (2) learning activities in groups, such as visiting exhibits and hearing nature talks.

5. *Active-expressive.*—These are activities where the emphasis is on physically strenuous activity for its own sake. Thus, a natural or natural-appearing setting is not required. Social interaction is a major source of satisfaction and manmade facilities often are common. Activities include motorcycle riding, water skiing, downhill snow skiing, swimming, boat racing, snowmobiling, and playing outdoor games.

The authors of this typology explored the relations of these five types to certain socioeconomic characteristics—especially to age and education (fig. 5). They concluded that different forms of outdoor recreation preferences appear at major life stages that are related to social factors as well as the physical capability of the age group.

Their model suggests that highly educated young people tend to prefer physically vigorous *appreciative-symbolic* activities and migrate, with age, toward less demanding activities of the same type or, to a somewhat lesser extent, toward

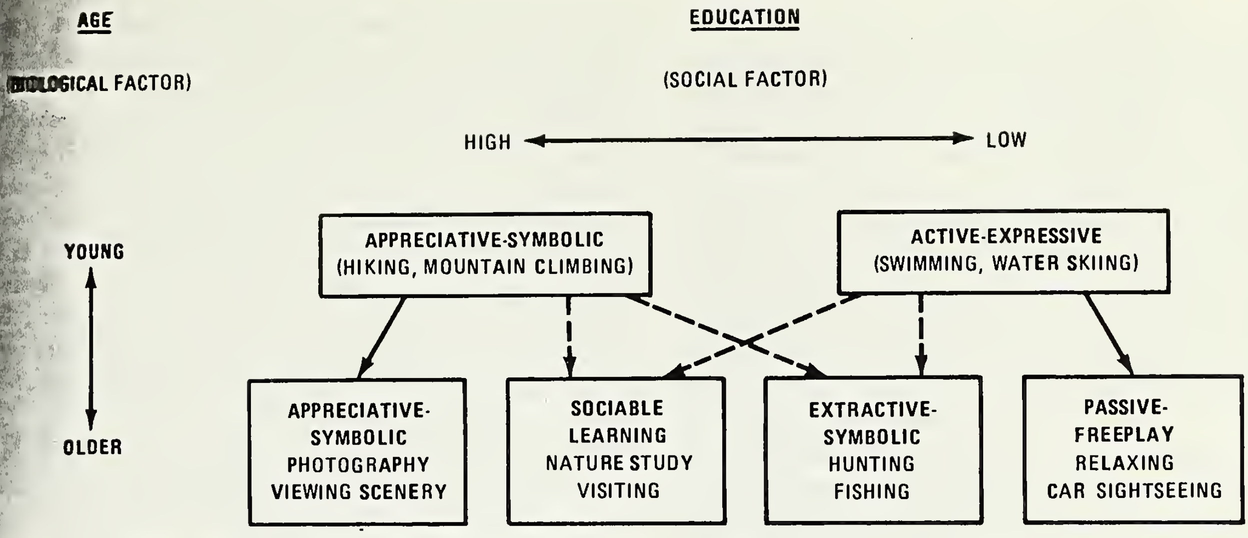

FIGURE 5.—Hypothetical changes in activity preference with age and education (source: *10*).

activities classified as *social learning* and *extractive-symbolic.* On the other hand, young persons having relatively less education are oriented toward *active-expressive* activities and migrate, with age, toward *passive free-play* activities and, to a somewhat lesser extent, toward *social learning* and *extractive-symbolic* pastimes.

Active-expressive and *appreciative-symbolic* activities generally are preferred more by younger age groups, and *passive free-play* activities are generally preferred more by older age groups. Preference for *extractive-symbolic* activities also declines with age. *Appreciative-symbolic* activities are generally preferred more by the highly educated recreationists, both young and old; *active-expressive*, *extractive-symbolic*, and *passive free-plays* are generally preferred by those having less education.

Implications For The Future

Regardless of its merits or validity, this typology consolidates many age-related activities into a framework that permits us to analyze and discuss demographic trends in relation to recreation use. Patterns of change in the five activity preferences can be ascertained without examining numerous inter-related individual activities.

The major demographic factors about which we are concerned are changing age structure caused by the aging of those born during the baby boom and the effects of declining population growth caused by the baby dearth following behind this boom. To a lesser extent, we also are concerned with changes in family structure, education, and social background of different age groups. The net effects of change in recreation participation are influenced, of course, by changes in other social and economic factors—changes in life styles, technology, fuel availability and costs, and level of discretionary income.

Appreciative-Symbolic Activities

It is reasonable to assume that there will be a continuing trend toward appreciative-symbolic activities as our population becomes more highly educated and more environmentally aware. This is likely to be particularly true after the baby boom generation reaches middle age and gains greater political and social dominance in the country.

Because of today's large numbers of young people, there is a relatively high participation in strenuous activities within this type. Relatively more demand is likely to develop gradually in the 1980's and 1990's in less strenuous activities of this type. Young backpackers may migrate to environmentally oriented campgrounds (*12*), for example, when they marry and have children (*1*). They may substitute day hikes in natural areas for long-distance overnight treks. Thus, day use and short trips in formal Wilderness Areas and/or backcountry are likely to increase in the 1980's, when young families and early middle-aged persons become relatively more numerous.

Past trends toward increased use of designated Wildernesses were caused in part by rapid increases in the youth and young adult population. For example, 59 percent of backpacking in 1972 was by persons 12 to 24 (*5*). Now that this youth group is starting to decline in relative size, future management plans and research should be oriented toward determining the future preferences and needs of these recreationists in their later life stages. Will they continue to visit formal Wildernesses or would various types of backcountry areas meet their tastes? Future plans for the development of backcountry recreation could provide a broad spectrum of activities in addition to the more strenuous activities traditionally associated with the use of formal Wildernesses (*15, 26, 11*).

For example, data indicate that most canoeists in the Boundary Waters Canoe Area (BWCA) are young. Lucas (*14*) found that 59 percent of the paddle canoeists were 13–19 years old; Peterson (*20*) found that 55 percent of the users were 13–19. Lucas also found that many were introduced to canoeing through youth camps. Youth groups portaged more and visited more remote lakes than did other groups. As these youths get older, use of the BWCA may gradually shift to the preferences of young families and middle-aged persons. Auto camping on the periphery of the Area, combined with day use, for example, might become significantly more important.

Active-Expressive Activities

Such activities are generally physically strenuous. Social interaction among participants and tests of skills or daring are often important motivating factors. No particular type of environmental setting is required. By their very nature, then, these activities appeal especially to youth, although older people may engage in them to a lesser degree.

Active-expressive activities should remain in strong demand for the remainder of the 1970's because young adults are likely to continue the activities of their youth. Certain activities such as water skiing, horseback riding, riding certain off-road vehicles, and winter sports are especially youth-oriented (table 1). By the early 1980's, however, a change in the relative importance of these activities should be noticeable.

Many argue that much of the decline in recreation participation with age is attributable to limited opportunity by the older generation to engage in those activities as youths, and that recreation participation levels will be much higher for older citizens in the future because today's youth have had such opportunities. Outdoor swimming is often cited to illustrate this point (*18, 19*). However, we contrasted the Outdoor Recreation Resources Commission projections with surveys by Mendell and Marans (*16*) and The Bureau of Outdoor Recreation (*4*) for swimming (all outdoor swimming away from home). As figure 6 shows, participation by age class has not increased in the last 10 years despite increased swimming opportunity.

Nevertheless, *The Recreation Imperative* (*25*) suggests that participation in swimming will grow in *all* age classes. This report estimated that 300 million Americans will swim by the year 2000. That would represent a total participation rate of *90 percent* for all ages, based on a total estimated population of 335 million!

Obviously, we need to better understand the basic factors that determine recreation participation at various stages over a person's life before we can determine how recreation preferences are likely to change in the future. Other factors have had an effect on the level of swimming participa-

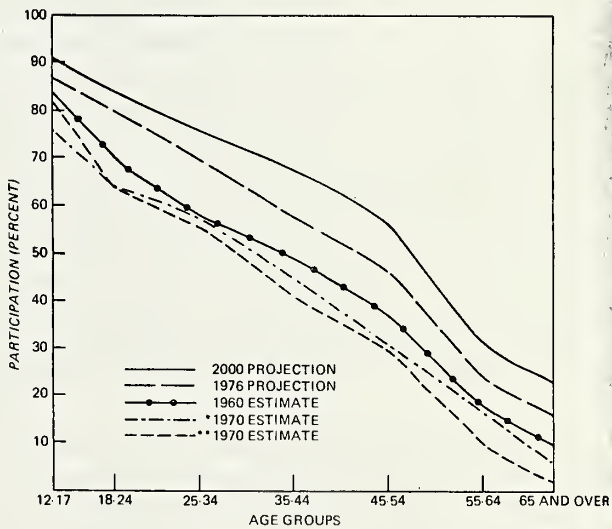

FIGURE 6.—Estimates and projections of outdoor swimming participation by age group, from selected recreation studies (projections for 2000 and 1976 and estimate for 1960 from the Outdoor Recreation Resources Review Commission (*19*); estimate for 1970 from the Bureau of Outdoor Recreation (*4*); estimate for 1970 from Mendell and Marans (*16*).

tion, such as decreased quality of swimming waters, greater opportunity for other types of recreation activities, and, perhaps, more backyard swimming pools.

The use of off-road recreation vehicles (motorcycles, dune buggies, snowmobiles, etc.) is youth-related (table 1). Projections of future trends in the use of off-road vehicles should be viewed with caution until it has been determined whether such use is likely to be pursued into older age or whether preferences will change to more passive activities. Past research has not adequately determined regional or national use trends and characteristics of these users.

Downhill snow skiing is another youth-oriented activity that has grown rapidly in the past 20 years (*13*). About two-thirds of all downhill skiers are under 30. The strenuousness of the sport and its potential hazards have been cited as reasons for it being a youth activity. Older people will ski, of course, but participation is likely to decline with age, especially after 40. Resource managers should be cautious about expanding the number of ski areas in the coming decades in view of these conditions as well as the following adverse trends: limited fuel availability, increased travel costs, and less discretionary income.

The great increase in organized sports also can be attributed, in part, to the rapid increase in the numbers of young people (10 to 24) in the last 20 years. The expansion of professional sports, such as hockey and football, has benefited from the rapid increase in the numbers of young athletes, but the number of persons in high school is now at a peak. In the 1980's, this rapid growth will virtually end. Therefore, comparatively less strenuous professional sports, such as golf and tennis, could become increasingly more popular in the 1980's and 1990's.

Participation in golf is fairly even across all age groups—from 12 to 64 (table 1). In fact, the older middle-aged group (45 to 64) shows a slightly higher rate of participation. Golfing should increase steadily in the 1980's. In the 1990's and beyond, a substantial boom in golfing could occur as the large numbers of people reach their 40's and 50's.

Passive Free-Play Activities

These types of activities are characterized by a modest expenditure of physical effort, facilities are typically convenience-oriented, and settings may be natural or manmade. Preference for these activities is positively related to age and, in general, negatively related to education. It has been postulated that people having relatively low educational levels who participate in active-expressive activities in their youth are more likely to gravitate to *passive free-play* activities as they get older. These activities may involve the use of recreation vehicles or second homes.

Passive free-play activities might become particularly important by the late 1980's as baby boom children reach middle age (40 to 64) when demands for second homes, travel trailers, and recreation vehicles are highest. These demands are not growing now as fast as they might later because of the low birth levels of the 1930's. Resort communities and high amenity campgrounds also may develop on the edges of national parks and Wildernesses. Monorails or other forms of transportation might be in demand for 1-day "excursions" into these areas.

After the year 2000, the population increase will be greatest in the older middle-aged groups and finally retirement-aged groups. The demand for service-oriented resorts and vacation or retirement communities may increase substantially. Perhaps large resorts and health spas in natural-appearing settings may become more popular.

Extractive-Symbolic Activities

Extractive-symbolic activities are, in general, only moderately age-related. These are characterized by the quest for "trophies" from the environment, such as animals, fish, rocks, shells, and photographs. Preference for these activities may be substituted in middle age for the more vigorous activities of youth. For example, a middle-aged water skier might keep his boat but shift to fishing. *Extractive-symbolic* activities should remain important for the middle-aged in the 1980's and 1990's.

The demand for backcountry recreation areas could increase substantially in the 1990's. Symbolic activities are particularly suited to backcountry or dispersed recreation areas because there is a broad range of options managers can use to enhance or even create pleasing recreation environments. Such options as fish stocking usually do not exist in wilderness management, for instance. Development of backcountry areas could provide a broad spectrum of recreation activities that could accommodate shifts in user preferences

caused by changes in age structure. For example, off-road vehicle trails could be used for hunting, fishing, or remote camping access.

Social learning activities

This class of activities includes both socializing and group-learning activities (hearing nature talks, visiting exhibits, etc.) (table 1). For their older counterparts, there may be a somewhat greater preference for group-learning activities. It is difficult to speculate about future trends in these activities because of their general appeal to all age groups. However, future emphasis should be placed on meeting the needs of an older, better-educated population. For example, interpretive services and exhibits may become more important.

Conclusion

Much more must be learned about the tastes, preferences, and perceptions of the American society if sound, reliable estimates are to be made regarding future participation in outdoor recreation activities. Longitudinal studies of the baby boom generation seem particularly warranted. The aging of this segment of our population is a key element in determining future recreation markets. Age is one of the most important determinants of recreation participation. But today's young people are better educated and may have different expectations, attitudes, and habits than their parents. In addition, young people have had opportunities to experience more and different kinds of recreation opportunities at an early age. Their future tastes and preferences may be significantly different from what might be predicted based on current participation data. Also, new technology might expand recreation opportunities; such has been the case with lightweight backpacking equipment and freeze-dried foods.

The future demand for outdoor recreation may not be as great as was envisioned as recently as 1973. In addition to the changing demographic factors discussed in this paper, outdoor recreation demand may be adversely affected by changing economic trends, such as increased travel costs and reduced discretionary income. This could bring about a substitution of home- or community-centered activities, such as gardening, for outdoor activities involving considerable travel.

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WISE USE OF ECONOMICS AND ECONOMISTS IN PUBLIC LAND NATURAL RESOURCE MANAGEMENT

Glen D. Fulcher [1]

Abstract

Invariably, conventional economic analysis has been used, based on profit maximization theory developed to guide decisions in the private sector of the economy, to evaluate management programs on public lands. For decisionmaking in management of public resources, we must abandon exclusive reliance on such analytical tools. Instead, we must utilize tools capable of producing results to guide public decisions aimed at achieving multiple objectives. Issues and opportunities for making resource economics more useful and effective in decisionmaking are: Improve design of research; organize land management agencies to effectively utilize economics expertise; involve economists at all levels of decisionmaking; economists at all levels of decisionmaking; economists must realize the search for acceptable alternatives is a political bargaining process; resource economists need training in physical sciences; least cost versus benefit/cost analysis as a more effective tool; NEPA increases need for resource economists; and economists must prove worth in job accomplishment to compete for scarce job.

It is both a pleasure and a challenge to discuss with you the subject of the use of economics and economists in public land natural resource management. It has been a long time since I have met with a group made up of such a high percentage of economists. I still consider myself to be an economist of sorts, but I am also an administrator. Marion Clawson used to say, "I have been an economist and an administrator in my career, but never both at the same time." So, in this discussion, I will be expressing the view of an administrator more than of an economist.

To set the tone of my position, I would like to repeat or paraphrase some of the opening remarks I made in a recent presentation to the Society for Range Management.

In this day of the environmental movement, we hear many criticisms of the economist, his economic tools, and the concept of progress and profit at the alluded-to degradation of the environment and the quality of life. A recent New Yorker cartoon had this caption, "I guess we have to pay for the higher standard of living by a lower quality of life."

It is common to hear such statements as: "On a purely cost-benefit basis it just wouldn't pay to save planet Earth" (Maurice Strong); "The Planet is perishing on prescriptions written only to serve the cash register" (Russel Train); and "Economic success may result in social, environmental, and ecological collapse" (Barkley and Seckler).

One economist, in all seriousness, once asked, "Why worry about erosion? If it doesn't pay to stop it, let it erode." Other economists have said, "If the cost of reclaiming strip-mined land is more than the land will sell for after it is reclaimed, don't reclaim it. It would be a missallocation of resources." There is much in these types of responses that points up the problem.

Economists are invariably trained in economic analysis developed to guide decisions in the private sector of the economy. They have effective tools to evaluate costs and returns to the businessman or private landowner as long as values can easily be put in dollar terms. However, too often they fail to consider long-range social costs or environmental consequences of man's activities, and they give only lip service to those non-market benefits and disbenefits that might result.

For decisionmaking in management of public resources, we must abandon exclusive reliance on economic tools designed primarily for the private sector. Instead, we must utilize tools capable of guiding public decisions aimed at achieving multiple objectives, some of which will be subjective in nature. In my opinion, too many economics professors, researchers, and practitioners fail to appreciate this problem.

A major responsibility of public land management agencies is to carry out the intent of

[1] Chief, Division of Standards and Technology, Bureau of Land Management, U.S. Department of the Interior, Denver, Colo.

Congress as indicated in enacted legislation. For example, major overall umbrella-type objectives of the Bureau of Land Management are spelled out in such legislation as the Taylor Grazing Act and the Classification and Multiple Use Act which, though no longer in force, are still followed. Some of these responsibilities are: Stop injury to the public grazing land; provide for the orderly use, improvement, and development of the public lands; stabilize the livestock industry dependent upon the public lands; and manage the public lands to best meet present and future needs of the American people. It is stated in the Multiple Use Act that, in determining values, the greatest dollar return or the greatest unit output is not necessarily the major consideration.

Public land management agencies, such as BLM and the Forest Service, are essentially in the habitat management business—not the recreation business, livestock business, lumber business, nor the game management business (with the possible exception of having to manage wild horses and burros that no one else wants).

Therefore, we who are public land administrators have different objectives than economic maximization in the market sense. We are interested in and responsible for maintaining a habitat for waterfowl production, streambank protection for fish, soil held in place, esthetic values, recreational use, survival of rare and endangered species, small mammals, reptiles, raptors, song birds, and, of course, timber, water, big game, and livestock production.

Many economists, tied to their profit maximization theories, try to place arbitrary values on all these products so they can use their prize tool, benefit-cost analysis. In my opinion, they continue to chase elusive butterflies and never come up with results that are of much use to the public administrator for making decisions on public lands.

There is no doubt Congress intended that agencies should carry out their responsibilities in an efficient and effective manner. I believe the intent of Congress can best be met by determining the least cost methods of meeting these objectives. However, most people who have been doing research in natural resources economics have had studies improperly designed to be of much use to decisionmaking for the public land administrator. Much of the research to date has been designed so that results are mostly of value to the private landowner. Almost exclusively, the researchers have attempted to measure benefits of resource development or management in terms of increased consumable outputs such as recreation man-days, hunter days, AUMs of forage, pounds of beef and lamb or wild game, acre feet of water and board feet of timber. They sometimes give verbal mention to other intangible values, but essentially they concentrate on the more easily measured outputs upon which they can place actual or arbitrary dollar values. Also, they often concentrate on only one of these outputs in their cost/benefit evaluation studies, and they tend to "assume away" other values.

A review of the literature points out how some researchers attempt to circumvent difficult evaluations. In recent economic studies of grazing systems on public land, researchers have "assumed away" the problem by making such statements as: "However, the problem of quantifying changes in non-grazing benefits can be circumvented by concentrating on the measurement of changes in livestock AUMs." (5) Question? What if increased livestock AUMs was not the major objective of the system? Or they can get into philosophical discussions of whether the agency is a proprietary agent of the Federal Government or an agent of the sovereign, which allows them to state: "As a proprietary agent managing an enterprise owned by the Federal Government, the agency can count as increased benefits from grazing systems only those which result in additional revenues." (5) Or another approach might be used, such as "Only measurable returns and costs have been included in (our) equations. This is not to deny the existence or importance of nonmeasurable or difficult returns to measure . . . (but). Rather than attempt to measure these returns directly, the approach taken in this study is to impute values to these external benefits . . . (for example) if the present value of the net returns computed according to (our) equation is negative the absolute value of this negative amount would indicate the imputed worth of all external benefits." (1) They would then go on to explain that if the negative amount isn't in fact their value, it is at least the amount society would have to pay to obtain them. If the amount in the equation is positive rather than negative, then all unmeasurable benefits are merely ignored because now it is assumed that public investment can be justified because it has been proven profitable in terms of returns to the

single user group, the ranchers. These and similar statements and approaches are far too common in the published research results.

Another major problem with current economic studies of natural resources development and management systems is that too often researchers use a "before and after" rather than a "with and without" evaluation. For example, the situation before initiation of a management system or development is compared to the condition after the system or development has been established. Such an analysis assumes that had the system or development not been initiated, conditions would have remained static and there would have been no change. Therefore, researchers conclude the benefits are only the increased outputs and they compare the costs to increased production. They fail to take into consideration what actually would have happened had there been no system or development initiated.

Economists are not unaware of the problems and possible deficiencies in research on natural resource development projects and management systems. They state, and rightly so, that it is often impossible to determine what would have happened had the system or development not been initiated. They don't have the convenient homogenous types of test plots of the physical researcher that they can check results against. Management systems and development projects, often large scale and nonduplicative, are not well designed for precise research evaluation.

I have no doubt belabored the point, but I hope I have been able to get across to you the relatively unusable nature of the results of much of the research to the public land administrator in carrying out his agency's responsibilities. I hope you can understand the frustration caused because more useful economic measures for decisions in public resource management have not been developed.

The foregoing has been somewhat opinionated and was intended to be disturbing to some of you. However, I hope, if nothing else, it will provide the basis for stimulating our discussions and that it might be of interest to you who teach, do research, and/or function as practicing economists in the field of resource economics.

At this point, I would like to turn to what I think are a few of the issues and opportunities for making resource economics and economists more useful and effective in the decisionmaking process for managing the Nation's public land resources.

1. As previously indicated, I believe a major problem is too much improperly designed research to provide meaningful and useful results. Right answers—regardless of how sophisticated—to wrong questions are, at best, misleading, and in the end, useless and downgrading to a profession. Have we done, and are we doing, effective research in outdoor recreational economics? If so, what has been sufficiently practical to be useful and what has not? Have evaluation studies using consumer surplus methodology ever been of value beyond an academic exercise and a means of obtaining these for degrees? Are economists guilty, as sometimes accused, of viewing sophisticated models as ends in themselves rather than tools for use in seeking solutions?

2. The resource economist is a Johnny-come-lately in expertise to the public land management agencies that have long been dominated by forestry, range management, and watershed personnel. The functional structure of such agencies—for example, the Bureau of Land Management—is not designed to effectively utilize economics expertise. The Bureau has over 12 divisions (forestry, range management, recreation, watershed. . . . etc.,) in which each division, of necessity, tries to justify its own program. Rather than have an Economics Division where the economist is an economist first and a specialist second, there is a tendency to put an economist in each division. The result is that the Division Chief, usually a physical scientist, often does not know how to utilize the economist's talents. The economist becomes the boy- or girl-Friday to do errands, write speeches, fill out reports, and gather data. He or she is isolated from other economists for stimulation, becomes dead-ended and soon realizes he must lose the economist image if he or she wants to advance.

What is needed is a resource economics division where economics expertise can be provided to the various activity programs as needed and the economist can have a career ladder and a feeling of belonging to an important segment of the organization.

3. Economists need to be involved at every

level of the decision-making process and should not be brought in merely to try to justify projects. The economist must be allowed to adequately evaluate all realistic alternatives. However, the economist must realize that the search for acceptable alternatives in public resource management is a political bargaining process where he or she can be of valuable assistance by providing information, but that traditional economical considerations may not be the most important factors in the final decisions.

4. Resource economists, to be effective, need to be more broadly trained than they have been in the past. They must know more about the physical aspects and the physical limiting factors of resource management if they are going to be effective and be accepted as equal members on the management team.

The economist needs some physical science background to more effectively communicate. This is especially evident for those economists who are involved in training programs and workshops involving noneconomists. Even though many resource economists make special effort to use what they think are simple terms with practical examples, results of trainee evaluations of workshps too often indicate the economics portion of the program was thought to be ivory-towered, theoretical, boring, and not relevant to the problems. Admittedly, natural resource curriculums need more economics courses so that the physical scientists can have a better grasp of economics. However, as long as we economists fail to effectively communicate, adequate economic consideration of problems will continue to be lacking.

5. As previously stated, the responsibilities of the public land management agencies are largely set out in legislative acts. These responsibilities are, in a sense, value judgments of Congress requiring managing agencies to meet certain standards or levels of habitat condition to provide sustained yields of the various multiple use products from the public lands. Congress, in passing the legislation, didn't say carry out this management only if there is an adequate benefit/cost ratio. What Congress really intended was for the agencies to carry out their responsibilities within the appropriations allowed, using least-cost alternatives. This can be a valuable and effective function of the resource economist. However, too often economists, both within and outside the Government, take the position that any moneys expended by land management agencies should be justified by benefit/cost analysis. Although benefit/cost analysis, especially using Water Resources Council Standards, can be a valuable analytical tool, its misuse only fuzzies the picture and doesn't improve relationships between economists and administrators.

6. New emphasis in public land management, especially environmental aspects, has increased the need for economics expertise. The requirements of the National Environmental Protection Act for environmental impact statements for developmental activities having any appreciable environmental impacts on an area have awakened this need. The economist has an important role to play in evaluating the social and economic impacts of alternative courses of action.

To reiterate, the resource economist has a significant role to play in natural resource management and the role has potential for increasing in importance. But if the resource economist is going to gain his place in the decisionmaking process, he must prove his worth. The public land administrator is faced with an increasing number of problems and an ever-expanding workload without increased manpower to do the job. Additional energy, minerals, range, recreation, forestry, watershed and planning specialists are needed. The administrator knows what to expect from these types of specialists. The job to be accomplished is now. The value of the economist in accomplishing the job is less certain and well defined. The administrator will allocate his or her scarce management position to the resource economist only if it is believed the economist will be as valuable or more valuable than a physical scientist in accomplishing the job. A key administrator once told me, "I can't afford to have an economist on my staff." My response was that he couldn't afford not to. But he was right if all economists were like the one or two with whom he has worked—Cloud Nine and steeped in theory. But I was right if economists were like some I have known—practical, tactful, quick to grasp the problem, and effective in both determining and evaluating alternative courses

of action. Will future economists be like the one pictured by the administrator or the one pictured by me? If it is the latter, the major step will have been taken toward wise use of economics and economists in public land natural resource management.

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Part II—The Demand for Outdoor Recreation

A VIEW FROM THE BUREAU OF OUTDOOR RECREATION

Maurice D. Arnold [1]

I am pleased to represent the Bureau of Outdoor Recreation at this Symposium. Director Watt wishes you great success in your deliberations.

You have asked me to suggest priority areas in which more economic research and theory are needed relating to demand for outdoor recreation. In this paper, I use "demand" in the economic rather than the planning sense.

I see two priority needs at this time: to give better market information and to examine even more carefully the many sides of land and resource utilization.

The first area—elaborating on markets— would make it easier for public and private decision-makers to decide on how and whether to serve specific recreational markets. The private entrepreneur—actual and potential—needs to know whether or not to enter or expand or contract in a market. Public agencies need to know when and where public investments are needed or justified. The body politic needs better definition as to which roles the private sector can plan best in the recreation delivery system, and which might be delegated to the public agencies. All of us need to know what public policies and standards ought to be established in order to broaden the swath of the private sector.

Why are these issues so important?

To answer the requirements of the American people and to preserve a high standard of quality in our living, we ought to make available a wide choice of quality opportunities, oftentimes in great quantities. It seems logical to me that the ability of the delivery system to offer a broad range of recreation alternatives is enhanced when we maximize private enterprise's participation in it. And offering the public diversity and depth of choice is in the public's interest. Moreover, it is good for us to know, rather than guess, the nature of public demand curves so that levels of public and private investments can be more realistically determined.

What information do we need?

We must define better and more discreetly determine the nature of the different recreation markets. Some of these markets are well known and easy to delineate. For example, the accommodations market can be well defined and broken down into geographic units fairly readily. Most are not so simple. The open space market is elusive. Many markets probably do not coincide with our definition of recreation. Moreover, the conventional listing of outdoor recreation activities is not broad enough to cover the range of recreational markets which has to be considered in order to come up with some reasonable definitions of markets within the purview of "outdoor recreation."

A next step is to obtain demand curves for these markets. What quantities will users want at given prices or costs? The broader the definition of "price" or "cost", the better.

In addition to demand curves which presumably will reflect, at best, only quantities that direct consumers will buy at given prices and costs, we need development of benefit and disbenefit curves. Much of the recreation delivery system has to be seen as a quasi-utility service. That is, the services rendered probably negate other social costs and, therefore, the system requires some governmental standards-making, regulation, and leadership. For this and other reasons, the costs of non-action or inaction need to be developed or characterized. Inasmuch as many of these costs are social in nature, the economists would have to enlist the services of other researchers, like behaviorists, to develop a more

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[1] Regional Director, Northeast Region, Bureau of Outdoor Recreation.

adequate picture of these alternative costs and benefits. Added to this, of course, will be a need to develop some concepts of marginal benefits and costs, as increments of service are provided or taken away.

Too, all of this must be done while accounting for changes in tastes and for availability of substitutes. It should account for differing mixes in leisure time availability, disposable income, and energy requirements and availability. We must also consider gradations of environmental quality and account for resulting social costs.

We badly need information about investment "break-even" points for given recreation markets. We have many "mom and pop" operations. Do we know investment constraints and how to develop year round operations? Most recreation operators make most decisions intuitively. While this is not necessarily bad, it does indicate that many recreational services may be unstable and undependable. This may be a reason why the public tends to turn to public agencies in many recreational fields. If we have better information about investments required and how the private sector may become or stay healthy in some of the markets, we might enhance the recreation delivery system.

Economists and members of other disciplines can help suggest ways in which governments can enhance the private sector by adoption of more realistic policies. For example, should there be more governmental standards, more adequately enforced so that the bulk of the private operators do not suffer from the hobgoblin of the private sector, the lowest common denominator? In the field of camping, the lowest common denominator operator is probably a determining force in moving many members of the public to insist upon camping areas inside public parks and owned and operated by public agencies. The result has been a loss of public funds as well as public areas to service this segment of a market, which, of course, needs service but which might be better served in other ways.

Should governments give guarantees for private recreation investment capital? Should there be policies set which permit private operation of areas held in public trust? Should governmental agencies contract like the private sector for certain general management services rather than have in-house staff? Should there be government financial and tax incentives for private and public open space and park areas? Should governments provide heavy dis-benefits for private occupation of some landmarks, hazard areas, and so on?

In the past and even today, most f the areas I mentioned have been largely untapped. We have very little information to go on. We, therefore, have very little concept of what the recreation market and the recreation delivery system are made of. We know that the primary motivator in the private sector is profit and in the public sector, votes. This will probably always be so. But more knowledge and data respecting recreation markets, capital and operating costs, the roles of public and private sector will permit us to move closer to dealing with the recreation delivery system as an entity.

The Bureau of Outdoor Recreation has begun to question more carefully a number of assumptions about the ways in which we approach demand and in which we make decisions about how to deal with demand. We have, I would say, become somewhat disenchanted with developing economic models, for such models have not proven to be beneficial. Moreover, they require considerable money and energy in care and feeding. In order to help throw some light on the problem and help us to reassess how we deal with these problems, we have contracted with the National Science Foundation to study the area and to make general recommendations to us. This year-long study began about 4 months ago. We hope it will give guidance to all of us on how to develop better information, how better to attack decision-making, and better insights on methods and systems which might be used to calculate needs.

A second priority area has to do with land and resource utilization.

In what arenas can we reasonably seek better accommodation of recreation and other economic uses as well as wise land use?

In one category, I would seek to show how many combinations and permutations of land uses would yield greatest long term returns for the community, region, and nation. For example, for a planned residential area, what are the optimum mixes of community use, health and social installations and grounds, open space and parks, business and industry, apartments, single homes, etc.? Models should assume different levels of intensity of development, including optimizing carrying capacity. They should also assume different transportation service configurations. And the costs should cover external ones, account-

ing for all energy gains and losses resulting from different models.

Another example: for given land areas, what are the optimum benefits and minimal costs, viewed long-term and broadly, of differing approaches to mining and end uses? Needless to say, but I'll say it anyway, the considerations mentioned in the previous example apply here, too. Moreover, here and elsewhere, as appropriate, the ecosystem changes must be accounted for.

Another category—closely related to if not actually joined to the one above—would yield more information about community costs, as well as those to the region and nation, when given different approaches to land management. For example, what are the costs and benefits of leaving lands in open space versus developing them? Another: What are the costs and benefits of having given public lands devoted to forestry practice or wilderness or recreation or multiple use versus new city development? Still another: What are the costs and savings to a community for requiring developers to "front end" all costs? (By "front end", I mean requiring the developer to assume environmental, certain common services, some social and most hazard costs, which they now usually pass on to the taxpayer rather than to the buyer.) Another: What kinds of generalizations are possible about optimum economic size ranges of cities, communities, and neighborhoods? We now know that there are dis-economies of scale, but we don't know enought to predict. A final example: What are the costs and benefits of different approaches to land control and set aside of recreational and open space lands? We now use combinations, zoning and full title acquisition as tools most of the time. This probably produces very low cost effectiveness. Many communities are now experimenting with other tools, so followup and feedback studies are in order.

A third category is more straightforward. Studies here would aim at ascertaining economic (including tax) impacts of proposed changes in use to conservation. All proposed changes should be accompanied by such impact studies, yet they are rare. And few of these can be called competent; some are sheer mythology and mumbo jumbo.

If this second priority area is better explored, what results can we expect? Maybe some park and recreation decisions which are now mostly based on hunch and intuition—that's not necessarily bad—can be based on better facts. Maybe we shall learn that it is not necessary to have lots of public expenditures to set aside park and open space areas. Maybe we will see—as many already do—that recreational and park lands can be delivered at negative cost—a saving—if we achieve more enlightened land management. Maybe we shall learn that growth and development are too costly in as many cases as it is beneficial. Maybe we might put better information in the hands of some community leaders who wish to retain viable neighborhoods. However, it would be too much to expect that perceptible changes will occur in most public and private decisions—entrenched disciplines, the nature and limitations of decision makers and economic and political pressures prevent noticeable changes. Yet, information and facts can help many who want and need help.

These, then, are two prime areas as I see it. One would result in better marketing information so that we can increase supply and cost effectiveness of the delivery system. The other area would produce better facts about land and resource utilization as related to recreation/conservation servicing, thereby permitting better land management and resource decisions when decision-makers want to base such decisions on hard facts. (There are, of course, other important needs for economic research related to demand.)

POLICY FORMATION AND PLANNING FOR OUTDOOR RECREATIONAL FACILITIES

Robert C. Lewis [1]

Abstract

This paper presents the results of a nationwide economic analysis of outdoor recreation as they apply to policy formation and planning for the development of outdoor recreational facilities. Topics covered include the total 1972 summer participation in selected activities, the price and income elasticities of the demand for outdoor recreation, the income levels of participants, the location of participants, the proportion of participation occurring on weekends, and forecasts of the growth in participation.

Policy Formation and Planning for Outdoor Recreational Development

One of the stated objectives of this symposium is "to facilitate application of economic science to policy formation, planning, and management of outdoor recreation." This paper will focus on the economic aspects of policy formation and planning which are contained in the results of an economic analysis of outdoor recreation entitled *Outdoor Recreation, A Legacy for America, Appendix A: An Economic Analysis*. (*1*) This report will consider only the policy and planning implications of the study results and will not deal with the data collection and analysis or the various methodologies employed. The reader is advised to consult the main study document for details on specific aspects of the analysis.

Total Participation

The results presented here are based on the analysis of data collected in a national survey of participation in outdoor recreational activities during the summer quarter of 1972. The survey was concentrated on the 28 activities which are listed in table 1, along with the estimated percentage of the U.S. population aged 12 and over who participated and the estimated total participation. By far the most popular activity is outdoor swimming which, when the two categories "outdoor pool swimming" and "other swimming outdoors" are summed, yields 744 million activity-days.[2] The five most popular activities in terms of total participation are swimming, walking for pleasure, picnicking, driving for pleasure, and sightseeing. These five activities account for over half of the total participation in all 28 activities.

Markets For Outdoor Recreation

The markets for many forms of outdoor recreation are characterized by market imperfections which generally lead to interference in the market by various government organizations who attempt to represent society as a whole. Without intervention, it is generally concluded that the uncontrolled market forces would lead to an undesirable allocation of recreational resources. Prominent among the market imperfections is the high level of "commodity transfer" or "transaction" costs required of participants in many outdoor recreational activities. These costs are the time and money spent traveling to recreational sites. Since the supply of any particular type of facility available to an individual is dependent on his location relative to the fixed location of the recreational sites, the commodity transfer or transaction costs vary among individual participants. It is generally conceded that government action to equalize these costs so that everyone has a more equal opportunity to participate is desirable. Of course, it is not always possible to provide the same outdoor recreational opportunities to everyone due to the lumpiness in the supply which is largely a result of natural phenomena, such as the location of mountains, oceans, lakes, and rivers.

[1] Economist, Bonneville Power Administration, U.S. Department of the Interior, Portland, Oreg.

[2] One activity-day was defined as one person participating in an activity for any part of one calendar day.

TABLE 1.—*Estimated percent participation and total participation for U.S. adult population during the summer quarter of 1972*

Activity	Estimated percent participation	Estimated total participation (millions of activity-days)
Picnicking	47	405. 1
Sightseeing	37	362. 8
Driving for pleasure	34	404. 9
Walking for pleasure	34	496. 3
Other swimming outdoors	34	487. 1
Visiting zoos, fairs, amusement parks	24	122. 5
Fishing	24	278. 2
Playing other outdoor games or sports	22	338. 8
Outdoor pool swimming	18	257. 0
Nature walks	17	148. 9
Other boating	15	126. 1
Going to outdoor sports events	12	96. 9
Camping in developed camp grounds	11	153. 3
Bicycling	10	214. 2
Going to outdoor concerts, plays, etc	7	26. 5
Horseback riding	5	51. 5
Hiking with a pack/mount/rock climb	5	45. 0
Tennis	5	81. 2
Water skiing	5	54. 1
Golf	5	63. 4
Camping in remote or wilderness areas	5	57. 5
Riding motorcycles off the road	5	58. 2
Bird watching	4	42. 0
Canoeing	3	18. 3
Sailing	3	32. 5
Hunting	3	17. 5
Wildlife and bird photography	2	19. 6
Driving 4-wheel vehicles off the road	2	26. 6

Source: *Outdoor Recreation A Legacy for America, Appendix A: An Economic Analysis*, Table 2–1, p. 39.

Markets for outdoor recreation also exhibit significant side effects which are not accounted for in the price. The general well-being of the present population and future generations is enhanced by the existence of outdoor recreational sites and facilities to a greater extent than is reflected in the total cost of participation. Recreational use is often compatible with preservation and esthetic uses which enhance the general well-being of non-participants as well as participants. Many of those who do not choose to participate at present may still benefit from the existence of the option to participate in the future. Since it is often-impractical to exclude any portion of the population from receiving the benefits of recreational sites, it is not possible for the market to function.

In order for government agencies to administer the development and maintenance of outdoor recreational facilities in a way that will maximize the social welfare, it is necessary to use policy decisions in place of market directed action to determine what, how much, where, and when recreation development should be undertaken. Informed judgment on these policy variables requires administrators to fully consider the elements of the demand for various outdoor recreational facilities.

The Demand For Outdoor Recreation

The demand for any goods or services is a schedule of the total amount of the commodity that would be purchased at alternative prices. Thus demand as used by economists is not a single value but a schedule of quantities dependent on alternative prices. The demand for a given outdoor recreational activity is normally expressed as the number of activity-days that would be consumed at different prices per activity-day. The price of an activity-day includes the commodity transfer cost of transportation to and from the recreation site as well as the on-site costs of participation such as admission fees. The quantity demanded is usually less at higher prices and more at lower prices. Thus, if recrational facilities are built near population centers, the price in terms of travel cost is low and the quantity of activity-days consumed by the local population will be high. Conversely, if identical facilities were built further away from the same population, the price of traveling to and from the site would be greater and the quantity of activity-days consumed would be less. Thus the location of recreational sites relative to the population influences the price participants must pay in order to participate, which, in turn, determines the quantity of activity-days consumed.

Price Elasticity

The responsiveness of the quantity of activity-days consumed to changes in the price per activity-day, both travel and on-site costs, is termed the price elasticity of demand. If a small increase in

the price of a recreation experience leads to a large change in the quantity of that experience demanded, the demand is said to be elastic. On the other hand, if a large change in the price per activity-day leads to a small change in the quantity demanded, the demand is said to be inelastic. Since the price paid per activity-day of recreation includes both the cost of travel and the on-site costs such as admission fees, the elasticity of the demand for an activity is helpful in determining where facilities should be built and how the level of admission charges will affect attendance. If the demand for an activity is highly inelastic, then the necessary travel distance and the level of the admission fee are not a large determinant of the quantity of that activity demanded and, therefore, are less important in the planning process. However, if the demand for an activity is highly elastic, then the location relative to the population and the amount of the admission charge is crucial to the level of attendance.

The elasticity of demand for a commodity is largely dependent on the existence of substitute goods and services and their prices. A good such as a particular brand of dry cereal—which has many substitutes at similar price levels—usually exhibits an elastic demand; if the price of one brand increases, the quantity consumed decreases since consumers simply buy more of the substitute brands. A good such as salt with few substitutes usually exhibits an inelastic demand since even when the price rises, a certain amount of salt is necessary and consumption will not change very much. In terms of outdoor recreation, a particular fishing site located 100 miles from a population center would most likely exhibit a relatively elastic demand since within the same 100 miles many substitutes at similar prices are most likely available. Conversely, a local public outdoor swimming pool would probably exhibit a relatively inelastic demand since few substitutes of similar prices would most likely be available.

Results from the analysis of the 1972 nationwide survey shown in Table 2 suggest that generally the demand for outdoor recreation is price inelastic. Overall, roughly a 5 percent increase in price would result in a 1 percent decrease in the quantity demanded. In other words, a 5 percent increase in the sum of the monetary travel costs plus the admission charges would result in only a 1 percent decrease in the total number of activity-days consumed at a given recreation site. Outdoor recreational trips which involve an overnight stay away from home are relatively more price elastic than outings which occur within 1 day. This price inelasticity of demand indicates that the recent increases in the price of gasoline will not affect the quantity of participation to a very large

TABLE 2.—*Price and income elasticities*

Activity	Vacations		Overnight trips		Day outings	
	Price elasticity	Income elasticity	Price elasticity	Income elasticity	Price elasticity	Income elasticity
Picnicking	−0.21	0.19	−0.26	0.16	−0.07	0. [illegible]
Sightseeing	−.21	.09	−.17	(1)	−.07	(1)
Walking for pleasure	−.22	(1)	−.19	.12	−.20	(1)
Other swimming outdoors	−.24	(1)	−.20	(1)	−.19	.15
Visiting zoos, fairs, amusement parks	−.19	(1)	−.20	(1)	−.06	(1)
Fishing	−.24	(1)	−.27	(1)	(1)	(1)
Playing other outdoor games or sports	−.21	(1)	−.22	(1)	−.08	(1)
Outdoor pool swimming	−.23	.24	−.23	(1)	−.18	(1)
Nature walks	−.22	.18	−.18	(1)	−.07	.18
Other boating	−.23	(1)	−.18	.29	(1)	.22
Going to outdoor sports events	(1)	.15	−.17	(1)	(1)	(1)
Camping in developed camp grounds	−.16	.14	−.15	.24	(2)	(2)
Bicycling	−.23	(1)	−.25	.23	−.16	.35
Going to outdoor concerts, plays, etc	(1)	.15	−.17	(1)	(1)	(1)
Water skiing	−.20	(1)	−.17	(1)	−.32	(1)
Riding motorcycles off the road	−.27	(1)	−.35	(1)	(1)	(1)

[1] Elasticity estimate is assumed to be zero since the estimated elasticity was not significantly different from zero.
[2] Not applicable.

Source: *Outdoor Recreation A Legacy for America, Appendix A: An Economic Analysis*, Table 1–3, p. 11.

extent. It also suggests that, within reason, the distance required to travel to recreational sites does not deter much recreational activity. In addition, it also suggests that some of the costs of providing recreational facilities could be collected through user fees without affecting the quantity consumed to any great extent.

Income Elasticity

The income elasticity of demand is the responsiveness of the quantity of a good or service demanded to changes in the average level of household income. Usually as income increases, the quantity of most commodities demanded also increases. If a small increase in the average level of family income results in a large increase in the demand for a given recreational activity, the demand is termed income elastic. Conversely, if a large increase in the average level of family income leads to a small change in the demand for a given activity the demand is said to be income inelastic.

The income elasticity of demand is a useful indicator of the extent to which the demand for given activities will increase as the average level of family income increases in the future. Those activities with the highest income elasticity of demand can be expected to grow the fastest in response to the expected growth in average family income levels. The estimated income elasticities for some of the activities covered in the 1972 survey are shown in table 2. In most cases, the estimated income elasticities were not significantly different from zero, and therefore, it was concluded that the future increases in the level of family income will have no effect on the level of participation in these cases. Those activities showing the greatest elasticities were for power boating, bicycling, nature walks, picnicking and swimming.

Level of Income

In addition to the responsiveness of demand to changes in income levels, it was also found that the absolute level of income is a strong determinant of who participates and of how much they participate. Outdoor recreation participants are primarily those in the middle to upper income brackets. In every one of the 28 specific activities shown in table 3, the median family income of the participants exceeded the median family income of the U.S. population which falls in the 6,000–7,999 category. In seven of the 28 activities—hunting, fishing, walking for pleasure, going to outdoor sports events, sightseeing, picnicking, and driving for pleasure—the median family income of participants fell in the $8,000-9,999 range. In the case of sailing, the median family income of participants fell in the $15,000–24,999 range. For the remaining 20 activities, the median family income of participants fell in the $10,000–14,999 range.

The high income levels of outdoor recreational participants indicates that much of the government provision of outdoor recreational facilities has benefited the middle and upper income groups. It may be worthwhile to reconsider the types of government investment in recreational facilities which have been made in the past, in light of positive efforts to provide more benefits for lower income families in the future. Although the 45 percent of the population with family incomes of less than $8,000 participate less than those with higher incomes, this low-income group takes 70 percent of all outdoor recreational outings which do not involve an overnight stay away from home. This information suggests that day-use facilities located near population centers would benefit lower income families while the provision of facilities in remote areas which lend themselves to overnight trips benefits middle to high income families.

Participation by Location of Residence

Of the total U.S. population aged 12 and over, 69 percent live in urban areas (in Standard Metropolitan Statistical Areas) and 31 percent live in rural areas. In all 28 specific activities considered in table 3, the number of participants from urban areas exceeded the number from rural areas. Rural inhabitants participated relatively more in camping, hunting, fishing, driving off-the-road recreational vehicles, power boating, picnicking, and driving for pleasure than did urban residents. In all other activities, urban residents participated relatively more than did rural inhabitants. Thus there are certain activities that appeal more to rural dwellers than to urban dwellers; however, in most cases, urban dwellers participate at a relatively higher rate.

Residents of the northeast census region were involved in more canoeing, sailing, both swimming categories, and going to outdoor concerts, plays, etc. per capita than were residents of the other census regions. Residents of the north central census region did more hunting, bird

TABLE 3.—*Participation by income and location*

Socioeconomic characteristics	Camping in remote or wilderness areas: Percent of participants	Camping in remote or wilderness areas: Activity days per participant	Camping in developed camp ground: Percent of participants	Camping in developed camp ground: Activity days per participant	Hunting: Percent of participants	Hunting: Activity days per participant	Fishing: Percent of participants	Fishing: Activity days per participant	Riding motorcycles off the road: Percent of participants	Riding motorcycles off the road: Activity days per participant	Driving 4-wheel vehicles off the road: Percent of participants	Driving 4-wheel vehicles off the road: Activity days per participant
Family income:												
Under $3,000	8	5.8	6	6.5	5	4.5	6	6.4	4	7.4	11	3.3
$3,000 to $5,999	9	10.6	8	6.3	11	3.2	15	7.8	14	7.4	7	7.7
$6,000 to $7,999	15	8.4	13	6.3	27	3.1	17	7.3	17	11.7	22	3.1
$8,000 to $9,999	14	10.5	16	10.5	18	3.7	16	7.9	11	8.9	10	13.2
$10,000 to $14,999	31	7.1	33	8.9	20	7.6	28	6.8	27	7.4	19	4.6
$15,000 to $24,999	14	6.5	19	10.5	14	4.4	13	6.6	21	6.7	23	7.4
$25,000 to $34,999	5	4.3	2	10.6	0	1.0	3	15.0	1	2.2	8	48.3
$35,000 and over	4	5.3	3	11.8	4	1.0	2	4.7	4	3.7	1	30.0
Place of residence:												
Not in SMSA	45	8.5	39	8.8	42	3.3	39	8.2	38	6.1	39	4.8
In SMSA	55	7.0	61	9.0	58	5.0	61	6.8	62	9.1	61	12.7
Census region:												
Northeast	14	9.4	19	14.6	15	7.9	19	7.2	18	6.2	9	10.4
North central	34	5.9	32	7.8	38	4.3	28	6.4	33	9.9	24	8.2
South	23	8.6	22	6.3	33	3.3	35	8.7	22	7.3	33	4.4
West	30	8.2	26	8.3	14	2.8	18	6.2	27	7.1	34	15.5

Socioeconomic characteristics	Nature walks: Percent of participants	Nature walks: Activity days per participant	Walking for pleasure: Percent of participants	Walking for pleasure: Activity days per participant	Bicycling: Percent of participants	Bicycling: Activity days per participant	Wildlife and bird photography: Percent of participants	Wildlife and bird photography: Activity days per participant	Bird watching: Percent of participants	Bird watching: Activity days per participant	Hiking with a pack/mountain/rock climbing: Percent of participants	Hiking with a pack/mountain/rock climbing: Activity days per participant
Family income:												
Under $3,000	5	4.7	7	11.8	6	10.1	11	5.5	7	6.9	5	6.0
$3,000 to $5,999	12	5.5	13	10.3	8	12.5	9	9.3	15	6.1	11	3.4
$6,000 to $7,999	13	4.3	15	7.4	13	11.5	7	1.9	11	3.3	12	2.5
$8,000 to $9,999	15	3.8	17	8.4	15	14.0	16	2.5	10	5.4	16	3.9
$10,000 to $14,999	31	4.9	26	7.6	29	14.9	26	6.1	34	7.4	32	7.1
$15,000 to $24,999	17	6.8	15	10.4	21	12.9	20	9.4	18	5.9	12	3.2
$25,000 to $34,999	5	15.6	4	15.2	5	10.0	6	6.0	2	16.0	8	10.3
$35,000 and over	2	9.5	3	8.9	2	5.3	6	8.4	2	13.8	4	6.0
Place of residence:												
Not in SMSA	32	4.8	32	9.0	29	12.7	34	8.8	32	6.5	32	6.1
In SMSA	68	6.0	68	9.2	71	13.0	66	4.9	68	6.7	68	4.9
Census region:												
Northeast	21	5.9	27	10.1	25	10.3	23	3.7	22	7.3	28	7.8
North Central	31	4.9	28	7.3	26	14.0	25	5.8	34	6.7	24	2.6
South	25	4.4	26	7.8	27	14.0	22	12.3	26	4.5	16	3.5
West	23	7.7	20	12.0	22	13.4	30	4.0	18	8.6	32	6.0

	Horseback riding		Water skiing		Canoeing		Sailing		Other boating		Outdoor pool swimming	
	Percent of participants	Activity days per participant	Percent of participants	Activity days per participant	Percent of participants	Activity days per participant	Percent of participants	Activity days per participant	Percent of participants	Activity days per participant	Percent of participants	Activity days per participant
Family income:												
Under $3,000	6	2.7	3	9.7	9	2.9	2	2.1	3	3.7	4	12.2
$3,000 to $5,999	10	13.0	6	3.2	5	2.9	6	3.5	9	5.4	10	7.7
$6,000 to $7,999	13	8.6	12	4.6	13	4.3	7	4.9	14	3.9	13	6.6
$8,000 to $9,999	12	2.6	14	4.9	16	3.7	5	4.0	13	5.5	18	6.4
$10,000 to $14,999	27	4.6	30	6.9	29	3.5	29	6.3	31	5.4	28	9.6
$15,000 to $24,999	20	6.3	23	4.8	19	2.8	25	3.1	23	5.6	19	11.1
$25,000 to $34,999	8	4.1	6	22.4	7	15.4	22	20.2	4	12.7	4	12.5
$35,000 and over	2	10.6	6	5.0	2	1.3	4	12.6	2	4.7	3	12.0
Place of residence:												
Not in SMSA	29	6.2	38	5.8	37	4.8	34	11.4	38	5.6	29	7.1
In SMSA	71	6.0	62	7.0	63	3.8	66	6.8	62	5.4	71	9.8
Census region:												
Northeast	22	7.2	19	5.5	33	6.2	39	11.6	22	5.1	30	9.2
North central	38	5.5	26	4.8	35	2.8	21	4.2	26	5.9	25	9.8
South	21	6.5	36	6.0	20	4.1	24	3.7	33	5.4	28	7.0
West	19	5.2	18	10.9	13	3.0	16	13.1	19	5.5	16	11.0

	Other swimming outdoors		Golf		Tennis		Playing other outdoor games or sports		Going to outdoor concerts, plays, etc.		Going to outdoor sports events	
	Percent of participants	Activity days per participant	Percent of participants	Activity days per participant	Percent of participants	Activity days per participant	Percent of participants	Activity days per participant	Percent of participants	Activity days per participant	Percent ot participants	Activity days per participant
Family income:												
Under $3,000	4	8.3	2	5.3	5	6.0	5	10.3	5	3.1	8	5.5
$3,000 to $5,999	11	8.6	4	11.1	6	9.1	11	9.7	12	3.5	10	6.0
$6,000 to $7,999	14	8.6	7	13.6	11	11.7	15	9.8	12	2.0	15	3.8
$8,000 to $9,999	17	8.3	19	9.1	12	8.1	18	8.4	12	1.9	20	5.4
$10,000 to $14,999	27	8.1	22	5.5	29	9.0	29	10.0	31	2.7	26	4.9
$15,000 to $24,999	18	9.5	37	8.2	25	9.8	17	9.6	21	2.3	16	5.6
$25,000 to $34,999	5	16.0	7	8.2	8	12.0	4	14.0	5	2.2	3	7.4
$35,000 and over	3	13.4	3	6.8	4	12.5	2	11.2	3	2.3	2	3.0
Place of residence:												
Not in SMSA	32	10.8	34	7.4	25	10.8	30	9.0	30	2.1	28	4.3
In SMSA	68	8.3	66	8.5	75	9.2	70	10.1	70	2.7	72	5.5
Census region:												
Northeast	33	10.1	29	6.1	26	10.0	26	9.1	34	2.5	24	5.9
North Central	21	7.3	33	9.4	25	10.7	29	10.6	30	2.0	34	5.6
South	29	8.8	24	9.2	29	9.8	29	8.7	20	3.1	27	4.7
West	17	9.8	14	7.9	20	7.5	16	11.1	16	2.9	15	3.8

TABLE 3.—*Participation by income and location*—Continued

	Visiting zoos, fairs, amusement parks		Sightseeing		Picnicking		Driving for pleasure		Percent of U.S. population age 12 and over
	Percent of participants	Activity days per participant	Percent of participants	Activity days per participant	Percent of participants	Activity days per participant	Percent of participants	Activity days per participant	
Family income:									
Under $3,000	5	2.7	6	7.5	7	4.4	7	5.7	15.0
$3,000 to $5,999	11	4.6	12	6.0	13	4.4	13	7.8	17.6
$6,000 to $7,999	16	3.5	16	5.4	16	5.1	15	8.9	12.0
$8,000 to $9,999	18	3.0	17	5.5	17	5.5	17	6.4	11.8
$10,000 to $14,999	29	2.8	27	6.0	27	5.9	27	7.3	22.6
$15,000 to $24,999	17	2.6	17	7.0	16	6.0	16	7.9	15.8
$25,000 to $34,999	3	4.7	4	6.3	3	7.9	3	7.9	[1] 5.4
$35,000 and over	2	2.1	2	5.6	2	6.3	2	6.0	
Place of residence:									
Not in SMSA	33	4.0	36	6.4	39	5.6	40	7.7	31.0
In SMSA	67	2.8	64	5.9	61	5.4	60	7.3	69.0
Census region:									
Northeast	26	3.1	23	6.5	23	6.5	21	9.1	24.9
North central	28	2.6	29	5.6	31	4.8	29	5.9	28.1
South	28	3.9	19	5.6	29	5.0	31	7.9	30.4
West	18	3.0	19	7.2	17	6.1	20	7.1	16.7

[1] Includes all family incomes of $25,000 or more.

Source: *Outdoor Recreation A Legacy for America, app. A: An Economic Analysis*, table 2–2, p. 42–51.

watching, horseback riding, golf, playing other outdoor games or sports, going to outdoor sports events, and picnicking per capita. Southern residents did more fishing and water skiing per capita. The per capita consumption of residents of the west census region was higher for all the other activities. Although the west census region contains only 16.7 percent of the total population, the number of participants involved in driving 4-wheel drive vehicles off the road, wildlife and bird photography, and hiking exceeded the number of participants from each of the other three regions. The south census region has the highest population of the four regions but contributes the most participants in only five activities: fishing, bicycling, water skiing, tennis, and driving for pleasure.

Weekend Participation

As shown in table 4, in each of the 28 activities surveyed more than 50 percent of the activity-days consumed were consumed on weekend days. Nearly 80 percent of the camping in remote or wilderness areas took place on weekends. Since more participation occurs on the two weekend days than on the five week days, providers of outdoor recreational facilities must plan for weekend capacity and accept large amounts of excess capacity on week days.

Growth in Demand

The growth in population and the growth in average family income are two of the most important determinants of the growth in the demand for outdoor recreation. If per capita demand for an activity remains constant, then the total demand will grow at the same rate as the population. If the per capita demand for an activity increases and the population is growing, then the demand for that activity will expand faster than the rate of population growth. Table 4 shows the forecasted increase between 1972 and 1978 which can be expected for 17 of the 28 activities considered. The expected increase for the other 11 activities was not included due to insufficient basic data. During the 1972 to 1978 period, the population is expected to increase 9 percent and the per capita income 13 percent. In 16 of the 17 activities listed, the per capita demand as well as the population is expected to increase. In the case of playing other outdoor games or sports, the expected increase in demand of 5 percent is less than the expected 9 percent increase in population indicating that the per capita demand for this activity will decrease. In aggregate, the total participation in outdoor recreation is expected to increase 12 percent between 1972 and 1978 while the population increases 9 percent; thus, the demand for outdoor recreation will increase one-third faster than the population.

TABLE 4.—*Weekend participation and forecast growth*

Activity	Percent of participation on weekends	Projected increase in participation between 1972 and 1973
Camping in remote or wilderness areas	0.796	(1)
Camping in developed camp grounds	.616	13
Hunting	.638	(1)
Fishing	.682	11
Riding motorcycles off the road	.618	12
Driving 4-wheel vehicles off the road	.564	(1)
Wildlife and bird photography	.564	(1)
Bird watching	.753	(1)
Hiking with a pack/mountain/rock climbing	.623	(1)
Nature walks	.696	15
Walking for pleasure	.641	12
Bicycling	.690	10
Horseback riding	.510	(1)
Water skiing	.692	15
Canoeing	.722	(1)
Sailing	.753	(1)
Other boating	.743	18
Outdoor pool swimming	.518	15
Other swimming outdoors	.685	13
Golf	.510	24
Tennis	.790	(1)
Playing other outdoor games or sports	.649	5
Going to outdoor concerts, plays, etc	.658	14
Going to outdoor sports events	.571	20
Visiting zoos, fairs, amusement parks	.552	10
Sightseeing	.616	11
Picnicking	.707	11

[1] No estimate was attempted due to insufficient basic data.

Source: *Outdoor Recreation A Legacy for America, app. A: An Economic Analysis*, table 5–1, p. 183 and table 3–2, p. 95.

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USING ECONOMIC DEMAND FUNCTIONS FOR RURAL OUTDOOR RECREATION

William E. Martin and Russell L. Gum [1]

In their paper "Economic Concepts Relevant to the Study of Outdoor Recreation," Johnston and Wennergren [2] showed that there is a "demand" (in the economic sense of the word) for outdoor recreation, that demand functions can be estimated statistically, and that values for recreation sites may be derived, using the demand functions. Our paper will attempt to put some meat on their conceptual bones by first briefly reviewing two rather large-scale empirical studies which used the basic concepts described by Johnston and Wennergren, and then suggesting some practical uses for that work by resource administrators.

The Arizona Studies of Demand for and Value of Rural Outdoor Recreation

In early 1971, the Arizona Game and Fish Department authorized a survey of hunting and fishing within the State covering the year 1970, having the general objective of determining the total economic value of benefits assignable to fish and wildlife in Arizona. Our research group saw this authorization and funding as an opportunity to apply the general Clawson-Hotelling method as described by Johnston and Wennergren to an entire State. The activities examined were deer hunting, other big game hunting, small game hunting, waterfowl hunting, predator hunting, cold water fishing, warm water fishing, and general rural outdoor recreation. General rural outdoor recreation included all rural outdoor recreation trips where either hunting or fishing was not the main purpose of the trip.

The results of this project are estimates of the alternative demands for and values of the recreational resource for each of the seven Arizona Game and Fish Department Regions when used for any of the specified activities. Complete details are published in Gum et al [*1*] and Martin et al [*2*].

The second project, sponsored by the Rocky Mountain Station of the USDA Forest Service, and begun in 1972, was site specific rather than area-activity specific. This project concentrated on specific sites within the 8 million acre Salt-Verde Basin in the central portion of the State. Since it was technically and economically impossible to examine each site, five sites were selected for study, each of which was judged to be representative of a class of sites in the area. From an agricultural economist's point of view, this selection was like studying "representative farms," a traditional and useful approach when each farm in the area cannot be examined individually.

The results of this second project are estimates of the demand for and values of each of the five representative sites in all recreational uses that occurred. (Since the uses are site specific, hunting is not an included activity.) Complete details of this study will not be published until early 1975.[3]

In both studies, it was determined that the household, as a composite of its elements, is the rural outdoor recreation consuming unit, that is,

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[1] Respectively, Professor of Agricultural Economics, University of Arizona, Tuscon, Ariz.; and Agricultural Economist, Natural Resources Economics Division, Economic Research Service, United States Department of Agriculture, and Associate Professor of Agricultural Economics, University of Arizona.

[2] Johnston, Warren and E. Boyd Wennergren, "Economic Concepts Relevant to the Study of Outdoor Recreation," paper presented to a National Symposium on The Economics of Outdoor Recreation, Forest Service and Louisiana Tech University cooperating, New Orleans, La., November 11–13, 1974.

[3] Sublette, Werner J. and William E. Martin, "Outdoor Recreation on National Forests in Central Arizona: Demand and Value", Arizona Agricultural Experiment Station Technical Bulletin, publication in process.

the decision-making unit. Even though a member of a household can participate in a recreational activity on his own accord, the person still functions within the general decision-making framework of the household. The household is the basic unit "that finances recreation out of a common household budget, and the decision to participate is presumed to have household sanction" [4]. Thus, the resultant demand curves, estimated in the general fashion as described by Johnston and Wennergren, gave the number of household-trips (in the hunting-fishing study) or the number of household-days (in the site specific study) that would be taken at alternative levels of "added cost".[4] "Added costs" are those costs above the recreator's observed level of expenditures, and thus could be interpreted as alternative posited entry fee charges per vehicle. Of course, access to the regions and sites for the activities is currently almost free—and possibly always will be—but we wish to know how much households would pay and participate *if* a fee were charged.

Some Empirical Demand Functions and Their Interpretation

Individual Area-Activity Curves

Table 1 presents the demand schedule for hunting deer in Arizona Game and Fish Region 1. (See figure 1 for location of Game and Fish Regions.) In 1970, an estimated 24,250 household-trips were made to Region 1 for the purpose of hunting deer. A certain amount of variable expense was associated with these trips (the average was $23 per household), but there was no entry fee to the Region, therefore, added costs were zero. Had there been added costs of $5 per household-trip, imposed either as an entry fee or simply occurring for any other reason associated with making the trip, it is estimated that only 20,176 household-trips would have been made. If the added cost was in the form of a fee, $100,880 would have been collected.

If higher levels of added cost had occurred, the number of trips taken would have been less and less until, if an added cost of $74 per household-

[4] The procedure for estimating economic demand functions is not always adaptable to include demand by nonresidents of the state. Therefore, to the extent that nonresidents participated in hunting, fishing and general rural outdoor recreation in Arizona in 1970, the value of the resources devoted to these activities was underestimated in the area-activity focused study. Expenditures and participation in hunting and fishing activities in Arizona by nonresidents is reported in [1]. It was possible to include nonresidents in the site specific study since the sample was selected from people who had actually visited the site, rather than from the general population of resident households.

Table 1.—*Estimated demand for deer hunting in Arizona Game and Fish Department, Region 1, 1970*

Added cost per trip	Number of trips	Total revenue
$0	24, 250	0
$5	20, 176	$100, 880
$10	17, 484	174, 845
$15	14, 722	220, 833
$20	13, 186	263, 724
$25	12, 083	302, 095
$30	11, 089	332, 673
$35 [1]	9, 826	[2] 343, 934
$40	8, 420	336, 800
$45	6, 357	286, 103
$50	5, 925	296, 261
$60	4, 063	243, 812
$70	1, 466	102, 654
$74	0	0

[1] Nondiscriminating monopolist price for the activity in the region.
[2] Nondiscriminating monopolist value for the activity in the region.

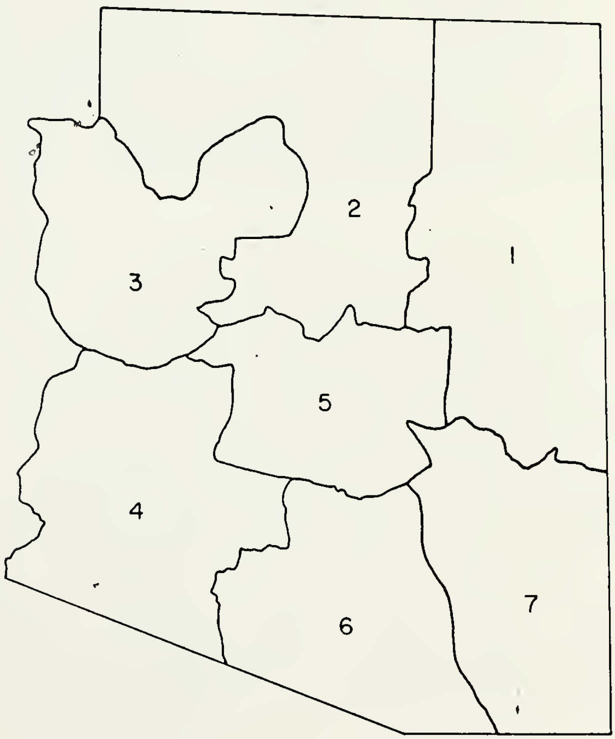

Figure 1.

trip had occurred, no trips would have been taken. Had the added cost been in the form of an entry fee, total revenues to the collector could have been maximized at a price of $35 per trip, even though the number of trips taken would have been less than at a lower price In this lower price range, demand for deer hunting in Region 1 is termed "inelastic"—increasing prices bring greater revenues even though less of the commodity is sold; at prices of more than $35 per household-trip, demand is "elastic"—higher prices would cause fewer trips and lower revenues until trips and revenues would finally fall to zero.

Aggregate Area-Activity Demand Curves

Table 2 shows the Statewide demand schedule for deer hunting determined by horizontally summing the seven regional demand schedules for deer hunting at each increment of added cost. The maximum value for total revenue on the Statewide schedule is $3,717,064 at a price of $60. Note that up to an entry price per trip of $60, all regions are hunted. Above that price, regions begin dropping out of the model until finally only Region 2, one of the best deer hunting regions, remains.

Individual Site-Specific Curves

The demand schedule for the use of Luna Lake—a multipurpose, developed site in a spruce, pine, and aspen forest near the New Mexico border—is presented in table 3. Interpretation is exactly the same as for the schedule for deer hunting in Region 1, as shown in table 1, except that the added costs and quantity of recreation taken is in terms of household-days rather than household-trips.

The difference in units of measurement occurred because of the differences in efficiency in estimating the statistical demand curves due to differences in the sample data between the two projects. In both projects, an attempt was made to estimate the statistical demand curves in terms of both household-trips and household-days. Household-trips gave the best statistical fit for the demand estimates on hunting and fishing activities. In addition, we felt that the number of trips would be more useful from a policy point of view since a single entry fee could be charged for each trip. In any case, average days per trip for every activity was less than 2.0. Thus, a household might make several trips of 2 days or less to a single Region for a given activity.

TABLE 2.—*Estimated aggregate demand for deer hunting in Arizona, 1970*

Added cost per trip	Number of trips	Total revenue	Regions included at the given added cost
$0	212, 812		All.
$5	183, 885	$919, 440	All.
$10	162, 149	1, 621, 523	All.
$15	144, 389	2, 165, 874	All.
$20	129, 344	2, 586, 954	All.
$25	117, 135	2, 928, 947	All.
$30	105, 149	3, 154, 555	All.
$35	95, 191	3, 331, 832	All.
$40	86, 618	3, 464, 823	All.
$45	78, 786	3, 545, 518	All.
$50	73, 381	3, 669, 223	All.
$60 [1]	61, 948	[2] 3, 717, 064	All.
$70	48, 511	3, 395, 994	1, 2, 4, 6, 7.
$80	41, 087	3, 287, 062	2, 4, 6, 7.
$90	36, 058	3, 245, 453	2, 4, 6, 7.
$100	33, 257	3, 325, 916	2, 4, 6, 7.
$110	29, 198	3, 213, 447	2, 4, 6, 7.
$120	19, 211	2, 305, 509	2, 4, 7.
$130	17, 426	2, 265, 507	2, 4, 7.
$140	15, 823	2, 215, 475	2, 4, 7.
$150	13, 344	2, 001, 857	2, 4, 7.
$160	9, 263	1, 482, 133	2, 4, 7.
$170	8, 484	1, 401, 503	2, 4.
$180	7, 643	1, 375, 979	2, 4.
$190	7, 096	1, 348, 310	2, 4.
$200	6, 578	1, 315, 677	2, 4.
$250	5, 142	1, 285, 710	2.
$300	4, 454	1, 110, 000	2.
$350	4, 028	1, 000, 000	2.
$400	3, 856	900, 000	2.
$439	0	0	None.

[1] Nondiscriminating monopolist price for deer hunting in the State.
[2] Nondiscriminating monopolist value for deer hunting in the State.

In studying a specific site, we found it was much more usual for the variability to be in days rather than in trips Usually, a household would make only a single trip to the site—but the number of days they stayed at the site depended on the cost of each day and the distance of the trip. Thus, the statistical estimates were much more efficient when household-days and cost per day were the quantity and price variables, respectively.

In addition, from a policy point of view, it normally would be preferable to charge a daily fee at a camping site if camping pressure were to be regulated.

TABLE 3.—*Estimated demand for recreation at Luna Lake, Ariz., 1972*

Added cost per day	Number of household days per year	Total revenue
$0	42, 751	0
$5	37, 087	$185, 435
$10	32, 094	320, 940
$15	27, 499	412, 485
$20	23, 226	464, 520
$25	19, 273	481, 825
$27 [1]	17, 901	[2] 483, 327
$30	15, 968	479, 040
$35	12, 791	447, 685
$40	10, 110	404, 400
$45	7, 687	345, 915
$50	5, 909	295, 450
$55	4, 206	231, 330
$60	1, 894	113, 640
$65	616	40, 040
$67	0	0

[1] Nondiscriminating monopolist price.
[2] Nondiscriminating monopolist value.

Recreation Resource Values

In their paper, Johnston and Wennergren showed how estimates of "consumer surplus value" of the resource in its use in recreation could be derived from the empirical demand schedules. Briefly, the "consumer surplus value" represents the potential revenue available if access fees to a recreation area could be collected from each recreator equal to the maximum amount that each recreator would pay for such access. Thus, unlike normal markets where a single price exists, multiple prices would be necessary if an agency were to attempt to capture all the consumer surplus value of a recreation area.

An alternative concept of resource value, also based upon empirical demand schedules, is the concept of nondiscriminating monopolist value. Nondiscriminating monopolist value corresponds to the maximum revenue which could be obtained by charging a single price for access to a resource, in our case, a recreation area.

Both consumer surplus value and nondiscriminating monopolist value can legitimately be used to describe the "value" of a recreation resource. However, for the purposes of the empirical examples in this paper, the monopolist values are reported. In the case of the previous example of demand for deer hunting in Region 1, the nondiscriminating monopolist value is $343,934 at a price of $35 per household-trip with an estimated participation of 9,826 household-trips.[5] For deer hunting in the total State, the value is $3,717,046 with 61,948 participants. The value for the State is lower than the sum of the nondiscriminating monopolist values for all Regions contained within the State. The reason is that if different "added costs" were charged for each Region, a larger revenue could be extracted than if only a single price were charged at the State level. Obviously, a larger total return could be obtained if one discriminated between Regions rather than charged a single price for the whole State.

Use of Recreational Demand and Value Estimates

Given a set of demand schedules and value estimates such as discussed above, how can this information be used by resource administrators in their dual roles of regulating and planning recreation use? The following examples based upon the hunting demand and value estimates above are presented to illustrate potential uses of recreation demand and value information.

Use of Demand Schedules

First, assume that deer hunting pressure across the State is higher than deemed desirable from a game management point of view. The number of hunting visits to a Region could be regulated by charging the appropriate fee rather than by the current 1974 approach of issuing permits. An obvious advantage of this approach would be that it would make money for the regulatory agency rather than simply creating administrative costs as does the present system. The size of the fee would depend on the number of hunters desired in the area. Reading from table 1, one sees that 24,500 household-visits were made to Region 1 for the purpose of hunting deer in 1970 when no fee was charged. If only 20,176 household-visits were desired, a $5 fee could be charged. In practice, the Department would wish to allocate pressure

[5] Since estimates are recorded at minimum intervals of $5 of added cost rather than at smaller intervals, the absolute maximum revenue obtainable could be within a one or two dollar interval about the $35 price shown. Intervals shown are $5 up to an added cost of $50, $10 intervals up to an added cost of $200 and $50 intervals thereafter.

between management units. Thus, the Department would need to adjust the fees in each unit around the $5 level to distinguish between hunting quality in each unit. (See figure 2 for Arizona Game and Fish Management Units.)

Second, assume that entry fees have remained at zero and that no permit system is in effect (the conditions at the time of the 1970 study), but that the variable costs of making a hunting trip rise because of some outside occurrence—for example, the recent increase in the cost of gasoline. An increase in the price of gasoline is an "added cost" just as would be an entry fee. Resource administrators could project anticipated levels of hunting pressure for the coming year by using the demand equations and the computed increase in average cost per trip.

Naturally, certain caveats are in order. The empirical demand schedules are based on the conditions of the single year observed. We know that if conditions change, the curves may shift and/or change in slope. In general, quantity demanded is a function of price, per capita incomes, population, prices of substitute goods, and tastes and preferences. Each of these variables was included in some form in the estimation process, but their

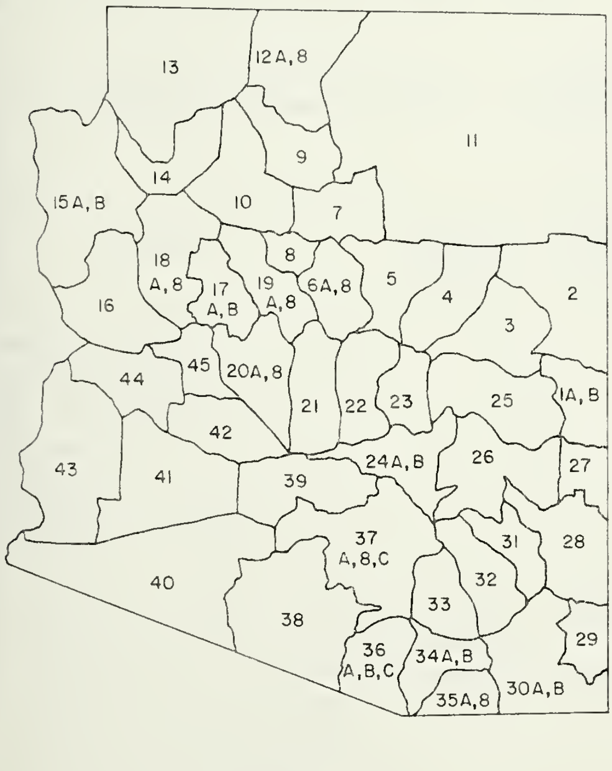

Figure 2.

effects may change over time. Thus, if these demand curves were to be used over a relatively long period of time, they would require periodic reestimation. Of course, such estimation problems occur with all demand relationships—not just those for recreation.

The problem of substitution between areas and activities would probably be the most serious difficulty in actually using the estimated demand curves to set a fee schedule. The curves given implicitly assume that there is no substitution between activites, areas, or sites as the additional costs to the particular area-activity in question are raised. Substitution surely would occur, but might be minimal if "fees" were being increased across all areas and/or all activities.[6]

Use of Recreation Values

The significance of value estimates is the role they can play in developing public land policies. Hunting, fishing and general rural outdoor recreation represent only three of the possible uses of the forest, rangeland, and water resources. Other alternatives include such uses as timber production, water production, and cattle grazing.

Often these alternative uses of the resource are unrelated or complementary to each other. In such cases, the values of two uses on the same set of resources would be additive—and no problem of decisionmaking in valuing trade-offs among competing uses arises. However, sometimes the various uses are competitive, and more of the product of one use can be achieved only at the sacrifice of some of the product of another use. Where such a multiple-product situation exists on a given resource base, the economic problem becomes one of maximizing the value of total output for a given set of costs.

For purposes of comparing the benefits of alternative resource plans, of developing a cost-benefit analysis, or for the economic efficiency

[6] Methods and problems involved in trying to introduce substitution possibilities into the equations were discussed n Martin, William E., Russell L. Gum and Arthur H. Smith, "Including Alternative Activities in Estimating the Demand for and Value of Rural Outdoor Recreation," paper presented at the joint meeting of the American Agricultural Economics Association, the Canadian Agricultural Economics Society, and the Western Agricultural Economics Association at Edmonton, Alberta, Canada, August 1973.

account of a multiple objective planning report, such values on all of the alternative products are necessary. It is not appropriate to attempt a detailed analysis of the general trade-off problem herein or to discuss the relative benefits of alternative planning methodologies. Rather, the discussion is limited to converting the value estimates presented in the previous section into values per section of land for hunting in order to set the value estimates in better context with other uses uses of the land and water resources.

The estimates of table 4 show the average value of a section of surface area in a particular Region in use for particular activities in 1970 when valued by the nondiscriminating monopolist procedure, and estimated values per section of land used in cattle ranching, for six ranching areas in Arizona that are roughly congruent with the Arizona Game and Fish Management Regions.

For example, one section (one square mile) of huntable deer range in Region 1 had an average value of $95 in use in 1970 for hunting deer. At the same time, huntable range for other big game in Region 1, some of which overlaps and some of which is separate from the deer range,

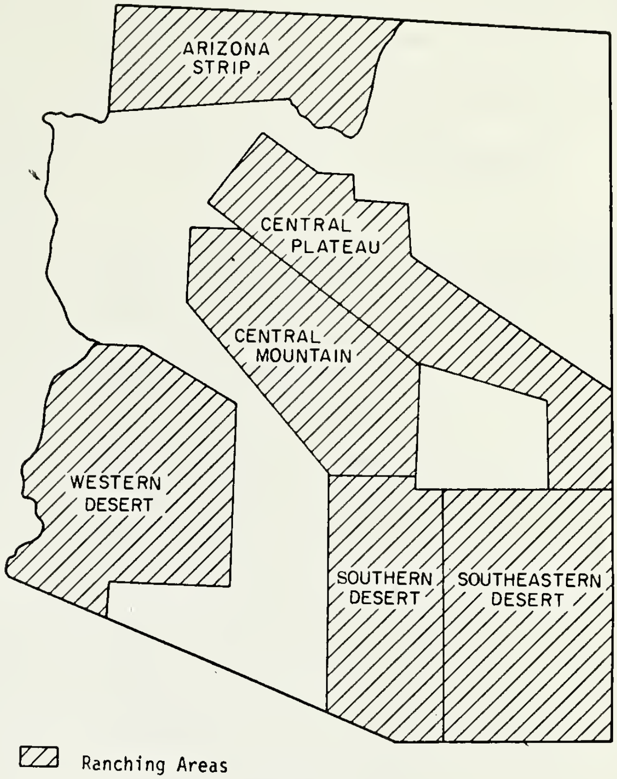

FIGURE 3.

TABLE 4.—*Comparison of Cattle Ranching, Deer Hunting, Other Big Game Hunting, and All Hunting Values for a Section of Land in Six Different Cattle Producing Areas in Arizona, 1970*

[In dollars per section]

Ranching area [1]	Annual value of cattle ranching [2]		Average nondiscriminating monopolist value of—		
	Marginal value public lands	Average value of all lands	Deer hunting	Other big game hunting [3]	All hunting
Western Desert (region 4)	55	140	27	([4])	103
Arizona Strip (region 2)	119	290	97	42	127
Southern Desert (region 6)	173	352	183	49	479
Central Mountain (region 5)	153	355	15	159	594
Central Plateau	236	425			
(Region 1)	----	----	95	94	159
(Region 2)	----	----	97	42	127
Southeastern Desert (region 7)	210	558	91	12	159

[1] See fig. 3. These ranching areas roughly compare to Arizona Game and Fish Management Regions as listed below.
Arizona Strip is the upper part of Region 2.
Central Plateau is the lower part of Region 2 and the most huntable portion of Region 1.
Central Mountain is mostly Region 5.
Western Desert is in Region 4.
Southern Desert is in Region 6.
Southeastern Desert is in Region 7.
Ranch budgets are not available for the area equivalent to Region 3.

[2] Total sale prices annualized at 6 percent interest.

[3] See footnote a, Table 22 of [2] for types of big game involved.

[4] No estimate.

was worth $94 per section. The weighted average value of all huntable area in Region 1 for all types of hunting was $159 per section.

Figure 3 shows a map of the State defining the six ranching areas. The areas were selected on the basis of similar land characteristics for grazing. The differences in values *between* areas given for grazing in Table 4 reflect the value of the land resource in cattle production; in the areas where grazing conditions are poorer, returns are lower than in areas which have prime grazing conditions.

The cattle ranching values *within* a single area were computed in two ways, thus giving a range in value. The marginal value of public lands represents the annual weighted average price of public land grazing permits at the margin as seen by the individual cattle ranch investor, and as revealed by a survey of ranch sales by Martin and Jefferies [*3*]. (Reported values were inflated to 1970 conditions.)

The average value of all lands for ranching is the annual equivalent (at 6 percent interest) of the average sale price of all ranches, including deeded land as well as the rights to public land permits, also as developed by Martin and Jefferies [*3*] and reported in Dickerman and Martin.[7] Whole ranches were selling for the average price per section (640 acres), while the marginal price represents the value of an additional section of public lands when added to a typical ranch in the area.

The above analysis is limited to a brief and rather rough comparison of land resource values when used in cattle ranching and/or in hunting. These comparisons do not imply that the activities are substitutes or that use for one activity or the other would be an optimum solution; rather they simply show that the value of the resource when used for recreation, a nonpriced product compares favorably with the use of the resource in traditional market priced activities—in fact recreation could have a comparable market price.

[7] Dickerman, Alan R. and William E. Martin, *Organization, costs and returns for Arizona cattle ranches*, Department of Agricultural Economics File Report 67-6, The University of Arizona, September 1967 (dittoed). (Deposited in the library of the University of Nevada as Arizona's contribution to Regional Research Project W-79. Each of the 11 Western States plus Texas and Hawaii has a contribution to this series.)

Summary and Conclusions

The concept of economic demand applies to outdoor recreation and can be empirically estimated. In addition, economic value can be ascribed to outdoor recreation by inferring from the empirical demand functions what people would have paid had there been a market for the recreation good; access to public land is the case of the examples presented above. We are not suggesting that such a market be created or that the administrative agencies should raise fees to the point where revenue is maximized. There are serious equity considerations that should be made before increases in fees could be justified. However, the nondiscriminating monopolist value gives a resource value that may be compared to values of alternative products of the land resource if decisions relative to compteing uses must be made, and can be used as a basis for cost benefit analysis or multiple objective planning.

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MARKET ANALYSIS FOR RECREATION MANAGERS

W. F. LaPage [1]

Abstract

If there are barriers to effective communication between economists and administrators in the field of outdoor recreation, one may be the six-letter word "demand." For the economist, "demand" is a concept of simple elegance and almost unlimited use. For the recreation manager, "demand" is that less than elegant—but equally unlimited—horde knocking down the gate. This paper suggests that there is a middleground—market analysis—where economic theory and the realities of administration can meet, and where both economists and managers can find useful answers to their questions.

The Director of Parks finds (to his dismay) that he has been seated next to an economist at the Rotary Club luncheon. With some misgivings, between the tomato juice and the salad, he asks the economist if the demand for camping will be higher next year. "That depends," replies the economist. "Depends on what?" "Well, price for one thing." "We just raised our camping fees last year, so we will have to leave them alone for a while; anyway, we had more campers than ever after the last price hike." "Perhaps your fees were too low to begin with, or perhaps everyone else raised theirs at the same time; and besides you know that the "price" of camping involves a lot more than just fees." At this point, the Director of Parks is beginning to think of ways to extricate himself gracefully before the inelasticities lead to indigestion.

What went wrong here was that the Parks Director was asking if the camping market was going to continue to grow. But, what the economist heard was: "How much camping will people be buying next year?" The two are related, but they are very different questions. The size of the camping market is a function of some uncontrollable factors, like weather, and some potentially controllable ones, like advertising and supply. The amount of camping people do is largely determined by individual decisionmaking processes.

Market Research Questions

The questions I usually hear being asked by public park managers and private investors alike are not questions of how much recreation at what price; they are questions of what kinds of recreation and for how long. Questions such as: "Should we build more campgrounds?" "How many of the 100 new campsites that we are planning should have full utility connections?" and "What caused last year's slump in attendance?" all indicate doubt about the market. They are readily translated into market research questions: "What growth stage is the camping market in?" "Has growth peaked for awhile, or should we get ready to accommodate more?" "How many more?" "How stable is the market; that is, will attendance be roughly constant despite minor changes in the economy?" "Is it a fad?" "Are there style trends within the market that will require changes in the design of facilities or in the location of facilities, such as more primitive campsites or more convenience campsites?"

Despite their relevant interests and training, economists have not been inclined to address themselves to the very important tasks of describing recreation markets, measuring their trends, and building models of how markets grow and respond to changes in their environment. The tasks have not grown easier while they were neglected; and the dynamic nature of markets has probably contributed to their neglect. Descriptive research is too often of transitory value; trends are difficult to distinguish from normal fluctuations in the short run; and the complexities of modeling markets apparently whimsically responsive to a great variety of social, political, economic, cultural, and meteorological forces are immense. However, the question raised by the Parks Director, and its related budgeting, planning, and land

[1] Leader, Outdoor Recreation Marketing Research Project of the Northeastern Forest Experiment Station, Forest Service (stationed at Forestry Sciences Laboratory, Durham, N.H.).

allocation considerations, is sufficiently important that we should make an effort to find the answer.

Recreation Markets

Complex phenomena are sometimes best approached through analogy. The market for automobiles is an appropriate point of departure for understanding many of today's recreation markets. Parallel growth in the automobile industry and in the availability of roads and highway services was not a masterpiece of public-private cooperation as much as it was the result of fortunate coincidences of public policy.

Long before the arrival of the first motor car, improved transportation was a matter of considerable concern to government. Incentives for developing improved transportation routes, canals, highways, and railways had emerged generations earlier. The growth of the highway industry paralleled that of the auto industry, with new automobile technology requiring more and better roads until finally both industries reached a size where their influence on the economy made them subject to public policy as "ends," as major sources of employment, rather than just as the "means" of improved commerce.

Recreation markets have rarely been recognized as deserving of special treatment because of their contribution to the economy, but they are no less dependent upon favorable public policy, changes in technology, and an element of good luck so that related industries will just happen to grow in step with each other. For example, continued growth in the sales of recreation vehicles by the several hundred manufacturers of truck campers, motor homes, and trailers depends on the uncoordinated policies of more than 100 Federal, State, and local parks agencies toward providing campsites. It also depends upon the availability of investment capital to thousands of private campsite developers; and on the ability of all of these developers to "read the market," or understand what people want.

Certainly the equipment manufacturers can market their products with no concern for where their equipment will be used. But, if they oversell their equipment beyond the existing capacity availability, and variety of campsites, their customers will become dissatisfied with camping conditions and will use their equipment less and less. Rather than see that equipment standing idle week after week, many owners will lend or rent it to their friends and neighbors. If they, too, find quality campsites lacking, they will become lost to the market as potential buyers of new equipment. Eventually, a second-hand market for camping equipment emerges, with the result that production of new equipment declines even further and some manufacturers may go out of the business. A few years ago, the Recreational Vehicle Institute estimated the number of manufacturers of mobile camping equipment at 800; last winter, the figure was down to 650, and today, it may be under 600 (*8 7*).

How Markets Work

The sequence of events that I have just described is not simply an illustration of the complex interdependence of industries serving a market, it is also a crude attempt at modeling how a market works. And, as such, it contains a number of "index points" for examining how well the market is performing.

"Performance," in the case of the recreational vehicle camping market, implies compatibility between: (1) The vehicle manufacturers, who must match their production capabilities and their marketing efforts with the needs of 23,000 dealerships, (2) the commercial campground industry, which must develop attractive, well located campsites to accommodate the new types of vehicles being produced each year, (3) the camping information industry, which must provide directories, reservation services, and ideas to the traveling public, (4) public agencies which contribute to the supply of alternative campsites, (5) more public agencies which provide highways and access to public lands, and (6) still more public agencies which regulate such things as the supply of gasoline and the licensing of vehicles.

Peaks and dips in the sales of recreational vehicles provide one kind of "barometer" to measure how well each segment of the market is reading, and responding to, the signals of all the other segments. But sales curves, like stock indexes, are supersensitive to the political economy in which they operate. The Camping/Recreational Vehicle Stock Index, a composite of 15 major stocks, dropped 33 percent from November of 1973 to November of 1974, while the Dow Jones dropped 36 percent. And sales curves fail to distinguish replacements from market expansion. If sales of equipment to new campers dropped to zero, it would still be possible to have a stable,

and perhaps growing, market for camping equipment and campsite rentals. Growth, if it occurred, would come not from the addition of new campers to the market, but from increased participation among active campers and renewed participation by former campers.

Obviously, then, our parks administrator must be concerned with two types of growth in the camping market: numbers of campers and average participation rates; that is, both "campers" and "days" rather than the usual "camper-days." He will plan differently if he expects 12,000 campers averaging 21 days per visit than for 21,000 campers averaging 12 days, even though both combinations produce a total of 252,000 camper-days. In the former case, he will have only about half as many permits to write, questions to answer, explanations of rules and regulations to give, and there will be important differences in trash collection procedures, traffic, supervision, and maintenance.

Components of Demand

It is through this kind of examination of the components of demand, and their interrelationships, that the market analyst can provide important insights both to the economist studying demand and to the park planner or administrator.

Let's examine, briefly, what we know about these two components—people and their participation—in the field of camping. And, incidentally, in case you are getting concerned about the emphasis on campers, I want to share with you some findings of a recent study by the NEM–42 Research Group. It indicates that campers and ex-campers, nationally, are responsible for about 52 percent of the reported picnicking, 56 percent of the swimming, 62 percent of the fishing, 70 percent of the boating, 73 percent of the hunting, 78 percent of the hiking and skiing, and 95 percent of the backpacking (*2*). And our own panel studies have shown that the most active campers are also the most frequent participants in other outdoor activities (*5*).

The number of people who have tried camping has increased by about 230 percent over the estimated 4.3 million households found to be campers by ORRRC in 1960 (*6*). A study sponspored by the Bureau of Outdoor Recreation in 1965 found an estimated 6.0 million camping households. In 1971, a study sponsored jointly by the Forest Service and the industry reported 12.6 million camping households (*3*). And last year, the NEM–42 study, which was also sponsored by selected camping industries and the Forest Service, found 14.3 million camping households (*2*). The growth rate is slowing from an average of 18 percent per year in the late 1960s to 6.5 percent annually in the early 1970s.

The number of active camping housholds is only a small part of the total market picture. Not only has the number of active campers been growing, but the number of persons who have tried camping and have given it up either temporarily or permanently has increased even faster. Unfortunately, statistics on inactive campers were not collected before 1971. However, their numbers increased by almost 50 percent, from 9.1 million households to 13.6 million households, from 1971 to 1973.

And while the numbers of campers and ex-campers have been swelling, the number of potential campers has been declining. The ORRRC study in 1960 identified an estimated 9 million households where respondents said they would like to try camping in the future. Roughly comparable survey techniques in 1973 found only 6 million households that were potential additions to the camping market.

What is immediately apparent from these statistics is that the camping market's potential for expansion has, itself, been expanded by the camping industry's promotional efforts since 1960, which have been exposing more people to the idea of camping and getting them to think about trying it. But that potential is now being depleted by a camping industry that apparently cannot hold on to its campers, and the number of former campers rivals the number in the active camping market. To a large degree, the key to future camping market growth appears to be this already large, and still growing, group of ex-campers.

At this time, possible ways the industry could stimulate growth in the camping market are, in order:

1. Encourage more participation by active campers—and slow down their transition from active to inactive
2. Reactivate former campers
3. Activate potential campers

Each of these strategies suggests some real marketing challenges for the camping and recrea-

tional vehicle industry. Our data suggest that before the current energy situation, the rate of transition from active to inactive status was accelerating, and that a growing number of active campers was camping less each year. In 1971, the ratio of inactive to active campers was 3:4. By 1973, it was 1:1. In 1971, one out of five active campers reported declining participation; in 1973, one out of every four active campers was camping less each year. In 1971, one out of every four households with high or moderate potential for camping was seriously planning its first camping trip. By 1973, only one in nine of these potential camping families was planning its first trip.

Clearly, not all consumers' intentions are fulfilled, so something less than 1 percent of the population might readily be encouraged to try camping for the first time; larger gains in camping market activity can probably be realized by working with the 21 percent of the population who are active and the 20 percent who are inactive campers. And this is just as true for the camping equipment industries as it is for the campground industry. A survey of recreational vehicle owners, conducted by the Woodall Publishing Company, indicates that nearly two out of three owners are on their second, third, or fourth camping vehicle (*1*). So more than one out of three owners may be in the market for their first replacement vehicle—or approximately 1.5 million potential customers, not counting those who are in the market for a third or fourth replacement or those making a move from tents to vehicles for the first time.

As for reactivating ex-campers, the NEM–42 National Survey of 1973 indicates that approximately 4 out of 10 ex-campers are out of the market only temporarily for a variety of personal reasons. Of those, 28 percent still own their equipment and 40 percent never owned any camping equipment, having rented or borrowed it previously. However, our own panel studies of camping participation have demonstrated how temporary inactivity can easily lead to permanent withdrawal from the market. In 79 percent of the cases we studied, we found that a single inactive year led either to further inactvity or to a return at a lower than average level of camping activity (*5*).

Market Research Potential

The challenge to the entire camping and recreational-vehicle industry at this time is to understand, and correct where possible, the causes of declining participation and the rapid increase in the numbers of ex-campers. And it is here that market research finds its greatest potential for delivering hard answers to managers as well as providing a testing ground for economic theories. Surveys of the causes of camper dissatisfaction; the effects of campground crowding; the effects of differential fees on attendance; the differences in perceptions of camping held by campers, ex-campers, and potential campers; and trends in camping style and frequency are just a few of the current studies aimed at better understanding participation decline and market drop-out.

In short, market research in outdoor recreation is increasingly being grounded both in economic theory and in the practical needs of investors, managers, and planners. For example, recent studies in both Massachusetts and New Hampshire examined the effects of differential campsite pricing on attendance, visit lengths, and shifting patterns of use. The New Hampshire study showed that a substantial increase in campground revenues could be realized by charging premium rates for waterfront campsites, with no political repercussions and no effect upon use levels (*4*).

Recent studies of the public's image of camping demonstrate how easily a shift in marketing emphasis might swell the "demand" for camping. Among potential campers, the favorable image of camping's attraction and its environment are offset by negative ideas of camping's difficulty and complexity (*2*). If marketing were to focus on reducing the complexity and inconvenience of camping, a major barrier to market expansion might be removed.

In conclusion, I have been suggesting that recreation economists and parks administrators are essentially concerned about recreation market behavior. And, I would further suggest that past research on demand-supply relationships, prices versus quantity purchased, elasticity coefficients, and rates of substitution, was largely undertaken in order to provide surrogate measures of, or at least partial insights into, the more difficult concepts of market systems and market performance.

As I mentioned before, most questions of recreation demand can realistically be framed in terms of doubts about the strength of recreation markets in the face of rising costs and changing social and individual priorities. When dealing with broad-appeal, heavily-invested markets, such as

camping, I would argue that these questions are directly researchable.

Finally, I hope that I have at least hinted that market analysis is a largely untapped research field for both administrators and economists. The cooperative research on fee differentials by the New Hampshire Division of State Parks and the Forest Service is one small example of the highly useful research that can be developed at low cost by simply monitoring changing administrative practices from available data. And economists should be playing a much stronger role in data collection and primary study formulation instead of lamenting the poor quality of available secondary data. Had they been doing so, it is doubtful that we would have seen the repeated failure of national recreation surveys, over the past decade or more, to collect data on the inactive and potential segments of the recreation market.

The public has a right to expect professionals to work together, and to do a better job than we have done to date in understanding recreation markets and planning for their orderly development. And I suggest that this goal can be achieved, at least in part, by recognizing the severe limitations of conventional supply-demand approaches to planning and substituting a practical understanding of recreation markets and marketing. Further, let's declare a moratorium on the repeated attempts to look into the future until we have a better understanding of how recreation markets are working now.

Revised Say's Law:
"Supply creates its own demand—in the presence of a marketing catalyst".

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Part III—Application of Economics to Outdoor Recreation

ECONOMIC EVALUATION OF NON-MARKET GOODS AND SERVICES

Paul F. O'Connell [1]

Abstract

Proxy prices can be identified for many outdoor recreation activities that are provided free or for a minimal fee, but considerable caution should be used when applying them. Economic analysis can also help clarify non-economic questions in forest land management. Examples are endangered species, conservation concerns, and landscape esthetics. Examining recreation resource attractions, access, and user distribution patterns for a base year can help the recreation planner identify recreation resources currently in short and plentiful supply. Demand and supply functions need to be developed from different source data to provide the manager with a balanced picture.

Introduction

I am a strong advocate of using economic tools to help clarify the relative demand for both market and non-market goods and services. Although these tools have obvious deficiencies, they are several times better than the alternatives: reacting to pressure groups and promoting personal biases. Managers of public lands have a responsibility to both vocal and non-vocal users of these lands. A well-conducted economic analysis helps bring the concerns of all users out in the open. An Act (No. 93-686) was passed by Congress this year giving a legislative push to the use of these methods. The 1974 Forest and Rangeland Environmental Management Act directs the Forest Service to include effective investment analysis for all proposed programs. Benefits and costs are to be identified in both economic and non-economic terms.

In this paper, I will summarize the state of the knowledge for developing non-market values, and discuss how we can evaluate those goods and services that do not fit in an economic framework. Finally, I will discuss the Arizona experience.

[1] Principal Economist, Rocky Mountain Forest and Range Experiment Station, Forest Service, Fort Collins, Colo. (Author stationed at Tucson, Ariz. in cooperation with the University of Arizona).

Economic Values

The economic values referred to here are for outputs and uses on forested lands for which beneficiaries (users) could be charged a market price, but for various reasons are provided free or for a minimal fee. Examples of outdoor recreation activities in this category are camping, picnicking, hiking, water sports, fishing, and hunting—any activity in the forest where the individual is actually participating, in contrast to just driving through the forest and observing the landscape.

As indicated in economic textbooks, demand is a function not only of price, but also of income, price of closely related goods, and taste and preferences. In most respcts, the demand for outdoor recreation is similar to other goods and services we purchase. The main differences are the lack of a market-determined price, and the immobility of most resources used for recreational purposes (*12*).

There are three main reasons why we need meaningful estimates of recreation demand (*11*). First, the public planning and budgetary allocation process requires knowledge of the demand for specific outdoor recreation activities to efficiently allocate scarce resources. The second reason relates to the importance of recreation activity in regional development; meaningful impacts on local economies cannot be determined without reasonable estimates of the value for the recreation opportunity. Third, recreation as a consumer good requires labor, capital, and land resource inputs; therefore, before these can be forthcoming, some benefit measure is required. Economic values are more meaningful than other measures of benefits.

Now I will summarize some strengths and weaknesses of approaches being used to value outdoor recreation where a market price does not exist.

Opportunity Cost Method

The basic economic concept used here is the maximum value the resources could produce in any other feasible use. For example, if a recreation site is set aside in the forest, timber harvesting and grazing are either eliminated or severely curtailed. The net reduction in stumpage and grazing values represents the opportunities foregone by setting the area aside for recreation. The approach is useful in establishing a benchmark value, but does not indicate the value of the site for outdoor recreation.

Gross Expenditure Method

This method attempts to measure the value of recreation to the participant in terms of the total amount of money he spends on recreation. These expenditures usually include travel expenses, equipment costs, and expenses incurred in the recreation area. This approach is useful in determining the amount of money spent for any recreation activity, but these expenditures do not indicate the value of the recreation opportunity. An analogy would be to argue that the costs of harvesting, transporting, and processing logs into rough lumber give us the stumpage value, which is not true. The value of the recreation opportunity and the tree in the forest represents the rent for the land in those respective uses. Rent is the residual payment to the land after all other costs of bringing a product to market are deducted from the finished product price. It is an additional cost to the consumer of the products. However, as will be discussed later, knowing the cost of participation can aid the analyst in finding the rent value.

Cost Method

The cost method assumes that the value of outdoor recreation is equal to the cost of providing it. Any recreation project which is contemplated can therefore be automatically justified. Its weakness is self-evident. A slight adjustment of this approach can be useful, however. As explained by Lundgren (*13*), knowing the cost-use ratio of existing facilities can give a manager some valuable information. The cost for campsites in low use areas may run as high as $200 to $300 per visitor day, but in high use areas be much lower. Although the approach is no measure of recreation value, it does indicate what the value would have to be to justify new investment in recreation facilities.

Market Value Comparisons

For this approach, the analyst attempts to find a comparable recreation site operated by a private entrepreneur. The method is conceptually correct because the fee charged represents the value of the recreation opportunity to the user, but in practice it is difficult to find similar conditions. One major problem is the ready availability of subsidized public recreation opportunities which prevents the development of profit-motivated ventures. Benchmark values may be estimated for activities such as golf, camping, and fishing, but generally the type of recreation activities offered in the forest are so different in surroundings and type that a standardized value can be very misleading.

Visitor Survey Method

The essence of this method is asking recreation users, with the use of a properly designed questionnaire, the maximum price they would pay to avoid being deprived of the use of a particular area. To minimize the possible bias in the answers respondents give, the questions are generally posed in the form of a bidding game. The method is conceptually correct, but there is a real question of reliability when people are asked their opinion of what they will pay for entrance, because they feel it might be implemented. What people say they will pay and what they will actually pay can be quite different.

Single Value Method

This method is conceptually similar to the market value comparison, but has been expanded beyond a simple comparison approach. In 1964, Senate Document 97, Supplement No. 1, established a range of values to be used for general and specialized recreation uses in the evaluation of water resource development projects. These have since been updated in the 1973 Water Resource Council Principles and Standards (*9*). The values range from $.75–$2.25 per recreation day for general recreation and $3.00–$9.00 per recreation day for specialized recreation. The value chosen within the range depends on the level of development at the site or intensity of use.

This approach has been widely adopted because it is theoretically correct and is simple to apply. The main problem is the lack of consideration for elasticity of demand at different recreation sites (*12*). In Minnesota, for example, a new reservoir would have a very elastic demand curve

because of a relatively large supply of existing lakes. However, the addition of another lake in Arizona would have a very inelastic curve. Most likely, the single value would be too high in one case and too low in the other. It also does not adequately consider differences in quality of recreation sites. The procedure inappropriately assigns the greatest value to the alternative attracting the largest number of people.

The Pacific Southwest Inter-Agency Committee has partially corrected this deficiency by assigning judgment factor scores to characteristics that determine attractiveness of a site. These include availability of alternatives, access, type of facilities, activities available at the site, and amenities of the area. (Forest Service Region 5) Economic Value Guide (*8*) has a full discussion on the application of this method.

Even with this addition to the approach, the user should be cautious in interpreting the results, because the artificial range in values cannot adequately reflect the real differences between values of recreation for alternative sites and activities.

Willingness to Pay

Willingness to pay, or consumer surplus, can be defined as the potential revenue available if actual fees to a recreation area could be collected from each recreator equal to the maximum amount that each recreator would pay for such access. It measures all the area under the demand curve (fig. 1). The procedure used to develop this type of demand curve is fully explained in "Economics of Outdoor Recreation" by Clawson and Knetsch (*7*). Variable costs (primarily travel expenses) are used as the surrogate price to arrive at the value of a particular site for recreation. Willingness to pay measures the value of the whole recreation experience, which includes anticipation and preparation for the trip, travel to the site, on-site expenses, travel back from the site, and recollection of the experience. The basic assumption is that if a person is willing to sacrifice $60 to go 600 miles for a given recreation activity, he would be willing to pay $30 entrance fee if the same opportunity were 300 miles closer to home. For this simple example, I assumed travel costs were 10 cents per mile. To make this approach more realistic, many economists have suggested imputing a cost for time and adding it to the travel costs before deriving a value for outdoor recreation.

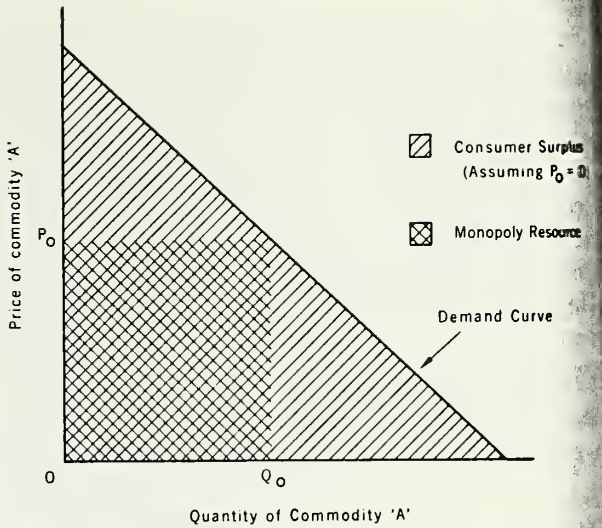

FIGURE 1.—Hypothetical demand curve for resource.

This approach has a strong theoretical basis and is the most direct approach discussed thus far. One limitation is the expense of gathering the necessary information. The population of concern must be surveyed, and considerable analysis is required to arrive at defensible values. Even the most defensible values are not comparbale to point values for stumpage and range resources, for example, because consumer surplus includes all the area under the demand curve (fig. 1).

Monopoly Revenue

This approach assumes the existence of a single monopolist owner of all available outdoor recreation opportunities The rational monopolist owner would want to charge a price for the resource that would maximize total revenue. That price can be determined with the use of the demand curve developed in figure 1. A hypothetical price and quantity is shown in that figure.

This method brings us closer to realistic market values for outdoor recreation than any of the other methods. The price is derived from the people actually engaged in the recreation activity, and has most of the strengths and weaknesses of any market price.[2] However, a problem of noncompa-

[2] Some economists who have used this approach are Brown, Singlc, and Castle (*5*), Brown and Nawas (*4*), and Martin, Gum, and Smith (*14*).

rability is still present. As indicated by Beardsley (*1*), the price was not arrived at by the interaction of supply and demand forces in the actual market place. It also represents a monopoly price which is different from a competitive price. Therefore, when using this value for investment purposes, it should be applied with considerable caution. Earlier in these proceedings, Dr. William Martin summarized the application of this method to Arizona conditions.

Non-Economic Values

Sometime back, I recognized, along with several other economists, that all concerns of man in managing a biological resource cannot be expressed in an economic model. The beauty of the landscape, the sound of a flowing stream, and requirements of future generations cannot be assigned an economic index and discounted to present value. They fit into an environmental quality account. Ways of handling these concerns for water-related problems are best developed in the Water Resources Council's Principles and Standards (*9*). The two main accounts suggested in the official version signed by the President are National Economic Development and Environmental Quality. The Regional Development and Social Well Being accounts can be developed as supplementary information, but are not to be used as the main criteria for decisionmaking at the national level.

In using these procedures, both beneficial and adverse effects are identified. Actual or derived economic values are developed to the fullest extent possible. If economic values cannot be developed, the effects are to be expressed in physical terms and related to the fullest extent possible to what affects people. When a study is completed, the analyst presents the decisionmaker with both quantified and non-quantified information. This way, the analyst is not presenting one final index such as the B–C ratio which summarizes all effects. The decisionmaker, along with input from the public, must decide tradeoffs between economic and non-economic concerns. This is an important assumption we have made in our research: that people have two basic value systems, tradeoffs in the economic area, and tradeoffs in the non-economic area. The difficult problem of determining what the final mix will be is determined through an open discussion between decisionmakers and interested public. I do not want to leave the impression that analysts have abdicated their responsibility with this conclusion, because there is much we can do with our economic and operations research tools to clarify the situation; but I want to emphasize that there is no common index available to measure all the pluses and minuses for a set of possible alternatives, and I doubt there ever will be.

Addressing myself specifically now to non-economic concerns in forest management, I will indicate some approaches that can be used to clarify tradeoffs.

Endangered Species

Wantrup's (*6*) critical zone approach is especially appropriate for this concern. He identified both an economic and a physical critical zone. The economic zone is considered a safe minimum standard and indicates the point at which the cost of preventing extinction of a spècies is minimal. If the physical zone is reached, it is often very costly to insure survival. Bishop (*2*) applied this approach to the California condor. He evaluated the sacrifice that would have to be made now to maintain the present number of California condors in their natural habitat. The results provide the managers of the forests with the activities (along with benefits foregone) that need to be curtailed to maintain the status quo.

Conservation Concerns

In this area, I will only discuss water quality and soil loss considerations because they represent some of the best examples of incorrect evaluations on forested lands. Water quality improvement is presently measured in three categories—low, moderate, and high—in terms of acre-feet. This approach gives a manager no meaningful decision information. All watersheds of concern should have water quality standards specified that depend on use made of the water. With this information, priorities can be given where dollars would attain the greatest benefit.

Soil losses have traditionally been measured in tons per acre This measurement approach says nothing about effects on people's use of these resources now or in the future. Effects should be measured in terms of loss of site productivity for type of vegetation and expected in route or down-

stream damage. For example, rehabilitation is far more critical in a watershed above a city than in sparsely populated areas, and maintaining site productivity on a high-value timber site should be of more immediate concern than it is in brush country that yields no useful product.

Landscape Esthetics

We have had a major effort underway the last couple of years in Arizona in developing a method to determine people's perception of different forest landscapes. We are developing this method in cooperation with the psychology department at the University of Arizona. The procedure consists of four steps: In *Step 1*, we represent the forest scene with unbiased color slide samples; for example, 15 slides are randomly selected from 50 taken to represent the area. Types of areas represented so far include stripcut areas, severely thinned areas, intensively and extensively managed silvicultural areas, and natural areas. *Step 2* involves the presentation of these slides to observers, including identifiable interest groups and the general public.

Step 3 is validation by observers in the field. We have taken two groups in the field to see if their on-site evaluation is similar to what they saw in the slides, and we found a very close correlation. *Step 4* is determination of a scenic value index. One primary advantage of this approach is that when people view these slides, they don't see a label associated with the scene. They have to evaluate the slide on its esthetic dimension on a scale from 1 to 10.

The real potential for this approach is to be able to predict people's response to alternative management systems. We are engaged in what we call feature analysis, where landscape features such as slash, stumps, size of trees, season of year are evaluated and used to predict scenic beauty directly without the use of slides or expensive field trips. With this information, the manager will have some idea of what people will accept before he specifies the prescription.

Early next year, Ron Boster and Terry Daniel will publish a major paper on this subject documenting our findings to date. One primary conclusion will be that most people, from Sierra Club enthusiasts to professional foresters, prefer an open stand of ponderosa pine to a dense, unmanaged stand. Some preliminary information is available in a paper entitled "Measuring Public Responses to Vegetation Management" (*3*).

There is insufficient time to discuss other non-economic values, but the main idea should be clear. With good analytical procedures, much information can be gathered to help the manager make a decision. An important point is that the effort should be intensive in those areas of critical importance in the decision process, and fairly broad in non-critical areas. In Arizona, for instance, a critical area is the conflict between using forested watersheds to grow trees or to increase water yield; in some Oregon forests, a major conflict exists between timber harvesting and maintaining pristine hiking trails.

Arizona Experience

A complete understanding of the supply conditions is necessary before demand information can be applied to a given recreation investment question. The quantity and quality of recreation opportunities available to population centers have a major effect on recreation use. To develop this information for National Forests and two Indian Reservations in central Arizona (fig. 2), we used analytical procedures similar to those appearing in a report entitled "Transportation Analysis Procedures for National Forest Planning" (*10*). The key criteria used in inventorying recreation resources are access networks, on-site natural resources, and facilities and services on site. The objectives of the central Arizona study are:

1. Determine access networks to outdoor recreation resources from the main population centers (primarily Phoenix).
2. Identify and quantify the resource variables that affect recreation use patterns on all developed and undeveloped sites.
3. With the use of factor analysis techniques, group the resource variables that have similar attraction characteristics and calculate relative attractiveness for each site.
4. Combine access networks with attractiveness scores to predict recreation use for a base year (1972).

The major access network for the study area is shown in figure 2. Secondary roads to each site from the highway are not shown. Access information was developed for distance and time by type of vehicle and season. There are 130 developed sites and 340 undeveloped sites. The developed sites are specified in Forest Service literature as designated areas for public use. They normally contain some form of user-oriented facilities such

as picnic tables, boat launches, or camp sites, and are generally enclosed in a fence for that use. Undeveloped sites are more natural in character and offer few obvious clues to their existence. Their existence is largely determined by attractions and activities available nearby. Lakes, streams, and springs along with shade, are the most important physical factors. Good fishing and hunting are the most significant activity factors. There is no list of such sites; recreationists find out about them by word of mouth or exploring. The land manager does not recognize these sites for management purposes. Both manager and user want to keep their existence secret to prevent overcrowding.

Points shown on the map may indicate more than one actual site. Inventoried sites often overlapped, so sites with similar attractions were grouped together. Sites with less than 200 annual visitor days use were not counted. Each site can be viewed as a recreation alternative possessing a distinct attraction for different recreation activity preferences. Because access and topography limit a person engaging in his choice of activities in a given region, the relationship between access and recreation resource attraction can be examined. In this study, we were fortunate that these National Forests and Reservations represent all the mountain-type recreation available within a 4- to 5-hour drive from Phoenix. To the North, South, and West are desert shrub and grassland.

The recreation resource variables considered for each site are listed below:

- Development Scale
- Special forest facilities
- Nearness to goods and service
- Capacity (persons at one time)
- Whether enroute to other recreation
- Travel time to population center
- Seasonal vehicle access*
- Special attractive features
- Climatic preference*
- Water sports quality*
- Fishing quality*
- Boating restrictions
- Miles of accessible stream
- Lake acreage
- Hunting quality*

*Variables that were also evaluated by season.

Both ordinal and cardinal scales were used as relative measures[3] for these resource variables. Variables such as capacity can be expressed on a cardinal scale as persons at one time, but for fishing quality, a five-point scale was developed with a range from excellent to zero. These 15 resource variables generated a large volume of data expressed in different numerical scales. Factor analysis was used to reduce the large number of variables by analyzing their correlations and expressing the results in one common numerical index. This analysis identified the following recreation resource factors that were then used in a multiple regression analysis to see how well they could predict recreation use for a base year:

- Travel time to site
- General development
- Special features
- Climatic suitability
- Lake and stream fishing
- Lake and stream water sports

In 1972, the recreation use (visitor days) on the six National Forests was:

Recreation activities	Use in thousands	Percent of total use
Camping	1, 578. 1	25. 7
Picnicking	302. 3	4. 9
Auto driving for pleasure	1, 796. 9	29. 3
Water sports	654. 8	10. 7
Fishing	602. 5	9. 8
Hunting	374. 6	6. 1
Other uses	826. 6	13. 5
Total use	6, 135. 5	100. 0

Approximately half this use occurred at undeveloped sites. In the regression analysis, these activities were combined into the following groups for each Ranger District in the study area:

(a) Camping, picnicking, sightseeing, and driving for pleasure.

(b) Lake water sports and fishing.

(c) Stream water sports and fishing.

[3] How these variables were measured will be discussed in a proposed Rocky Mountain Station Research Paper, "Relationship of outdoor recreation and use for National Forests in central Arizona", by John Hammond and Paul F. O'Connell, planned for publication in late 1975.

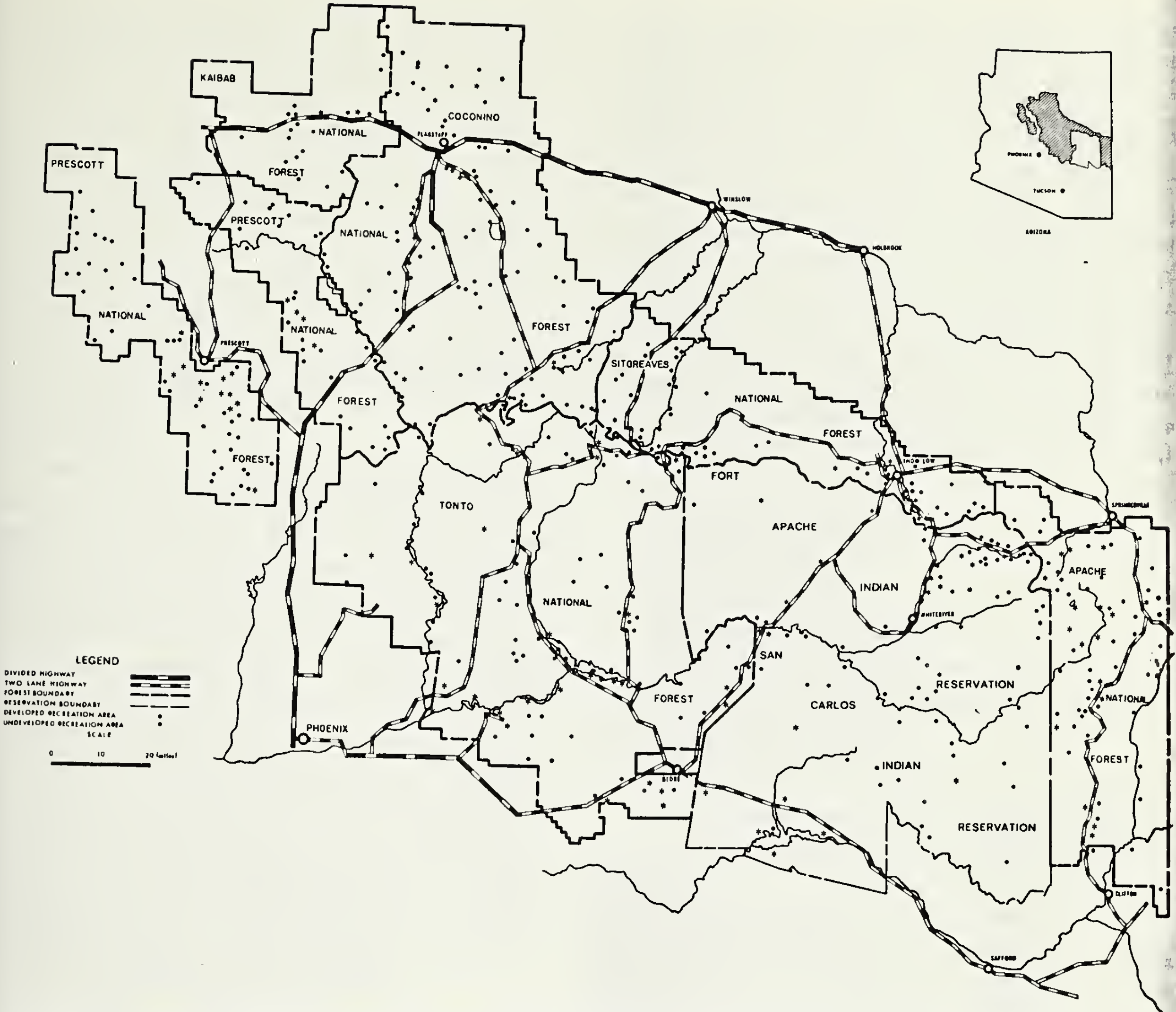

FIGURE 2.—National Forest and Indian reservation recreational areas in and adjacent to the Salt-Verde Basin, Ariz.

Hunting and other uses were not included in the statistical test. Each group has different resource requirements along with some that are common to all. All sites were combined into Ranger Districts for this test because use information was not available at a lower administrative level.

The resource variables predicted actual recreation use from the Phoenix metropolitan area with an R^2 correlation of 0.92. General development, climatic suitability, and lake and stream sports were the best predicting variables.

Surprisingly, access appeared relatively unimportant. The main deterrent to the use of any one site is the type of road from the main highway to the site, and that information was lost when the sites were combined into Districts. Another suspected reason why distance was not a strong predicting factor is that all Districts can be reached from Phoenix in less than 5 hours; for weekend recreation, that travel time is just beginning to become a constraint.

The resources needed for lake and stream fishing are highly correlated with those needed for lake and stream sports, so one is essentially measuring the other. Special features include such things as a scenic view, outstanding rock formation, Indian ruins, or the site of a historical event. Special features probably are not a strong attracting fac-

tor for a specific site because the whole area offers a variety of these features.

What does all this mean? I interpret it to mean that the following variables were the primary attraction factors for about 80.0 percent of the outdoor recreation use in the study area from the Phoenix area for 1972:

A. *Resource*
   1. Climatic relief
   2. Lakes and streams
   3. Special attractions
      a. Geological formations
      b. Historical sites
      c. Scenic views
      d. etc.

B. *Investment*
   1. Access
   2. General development
      a. Campsites
      b. Reservoirs
      c. Stocking of fish
      d. etc.

Their relative importance will be discussed in Hammond and O'Connell.[3] This supply information is valuable for questions being posed today on Arizona watersheds. Will moderate vegetation manipulation for water yield improvement in the ponderosa pine and brush vegetation types affect recreation use in either a positive or negative way? The esthetic studies (summarized earlier) and this supply information lead us to the conclusion that they will not.

The most effective use of this supply data occurs when it is combined with demand functions. Dr. William Martin earlier presented some demand functions for hunting, fishing, general outdoor recreation, and representative sites for Arizona conditions. With this demand information, we have some indication of elasticities and relative values for recreation activities. If these demand curves agree with the actual behavior pattern of the whole population, we are close to finding those investments that will create the greatest net benefits. For example, Dr. Martin showed that the demand curve for recreation in brushland converted to grass is flat with a relatively low value, whereas the demand for a reservoir and campground in mixed conifer is relatively inelastic with a high value. The use pattern in 1972 supported this conclusion. However, if the demand projection and present use pattern do not agree, we should begin reorienting our investments toward the high demand priorities. We need to be very careful about projecting present use rates.

In the introduction to this section, I indicated that the quantity and quality of available recreation opportunities have a major effect on recreation use. They do, but carried to their obvious conclusion, 20 years in the future we will have the same mix of recreation activities we now have, except more of them. If the last 20 years are any indication of the future, we know the recreation mix will be considerably different. Recreation planners need to be constantly aware of changes in technology and shifts in recreation demand, or we will end up with inefficient allocation of scarce resources. As suggested by Kalter (*11*), demand functions need to be developed from different source data than the supply functions if they are to provide useful guidance in recreation planning.

Conclusions

A key point of this paper is the necessity for recreation planners to examine the whole recreation picture before coming to conclusions on where scarce resources should be used. If only one site is evaluated before understanding the demands of of the population that will be served and alternative opportunities available to that population, an incorrect decision is not only possible, but very probable. Determining recreation demand is not simply assigning a commonly used index to a variety of recreation activities. The problem is far more complex; if outdoor recreation on forested lands is to command the investment and operating dollars required to meet the demand, more complete studies are required than are now available.

Another major conclusion relates to the use of imputed economic values discussed in section one. Methodology has not developed sufficiently to directly compare imputed values for outdoor recreation with market-derived values for timber, forage, and water. The monopoly revenue approach is the most realistic, but is not determined in an actual market and does not address itself sufficiently to the incremental value problem of determining the value of an additional site. The

[3] Ibid.

imputed values should still be used, however, as an index of value. When presenting the final results of a land use plan to the manager, the analyst should present both a benefit-cost analysis with only market-derived values, and also one with both market and non-market values combined. In that way, both the analyst and the manager making the decision are always aware that there are differences in the way the economic values were developed.

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DETERMINANTS OF CHOICE IN OUTDOOR RECREATION

David A. King and Merton T. Richards [1]

Abstract

A heuristic model of recreational behavior, based on an amplification of the consumer behavior model, is presented. Preferences, an element of the consumer behavior model, are defined as consisting of a preference process resulting in choice. In the preference process, the individual exercises the power of choice, the ability to discern differences among commodities. Choice is defined as a rank ordering of a set of commodities. Using the model as a framework, research findings relevant to recreational preferences are reviewed. Given the complexity of recreation behavior and the state of knowledge regarding it, we are led to conclude that it will be some time before the manager can expect more useful explanations of behavior and operational measures of satisfaction. Better explanations and measures will require cooperation among social scientists from several disciplines.

One might be inclined to wonder why this workshop wasn't entitled "Demand for Outdoor Recreation". After all, economic demand theory is a theory of choice or decision and the consumer behavior model expressing demand theory is a model of choice or decision.[2] The reason is that, in some views, the variables included in recreation demand and consumption studies have accounted for a relatively low proportion of the variation in recreation participation. This would suggest that the reasons underlying this participation are more complex than represented by the social, income, and price variables typically used in these studies. Our position is that the consumer behavior model needs to be more thoroughly developed in its application to the analysis of recreational demand and participation. Specifically, we would like to take a more detailed look at the concepts of preference and choice in the decision to participate in outdoor recreation.

We will present a heuristic model of recreation behavior to show how the consumer behavior model might be amplified and how other social sciences and economics might be usefully integrated to provide better predictions of recreation participation. The model will also be used as a framework for discussing the state of knowledge regarding factors influencing recreational behavior.

Consumer Behavior Model

The consumer behavior model of demand theory has been touched on by Johnston and Wennergren (*8*) at this symposium. As they pointed out, the quantity of a commodity demanded by an individual depends on: 1) The price of the commodity, 2) his income, 3) his tastes and preferences, 4) the prices of alternative goods, and 5) his expectations.

Empirical recreation demand studies have usually included only price, income, and preference variables. A very few have attempted to consider prices of alternative recreation commodities (*1*, *11*, *12*). Expectations of the recreational visitor were considered by Kurtz (*11*).

The influence of preferences has been included in most demand and participation studies only to the extent that certain proxy variables do represent differences in preference among individuals. The proxy variables used are the familiar "social" variables of age, family structure, education, occupation, past recreational experience, etc. More explicit measures of preference and/or better proxy variables could be expected to improve the predictive power of recreation demand and participation studies.

An Alternative

The heuristic model of recreation behavior we would like to propose is based on an expansion of the consumer behavior model. In so doing, we are making an incursion, with more than just some trepidation, into the areas of sociology, psychology,

[1] Professor and Research Associate, respectively, School of Renewable Natural Resources, the University of Arizona, Tucson, Ariz.

[2] At a later point, we will discriminate between choice and decision. We would prefer to use the word decision at this point, but choice reflects traditional usage.

and social psychology. We feel, however, that the crossing of disciplinary boundaries is necessary if progress is to be achieved in explaining recreational behavior. Our purpose is to spark discussion. The model has not been operationalized, nor even completely conceptualized.

Given these caveats, the model is shown in figure 1. Special attention must be given to the definition of three terms used in the model: preferences, choice, and decision. Preferences, as used in the demand equation, consist of a preference process resulting in choice. It is through the preference process that the individual exercises the power of choice. The power of choice is the ability of an individual to discern differences among alternative commodities according to the expected utility or satisfaction to be gained from consumption. Choice, on the other hand, is the rank ordering of commodities resulting from the exercise of power of choice and is, therefore, based on the predilections and judgment of the individual. In other words, choice is a set of selections over a range of commodities.

Choice and decision, moreover, are not synonymous. As Dunlop (*5*) has observed: "*There can be choice without decision; but there cannot be decision without choice.*" Decision is an act in which the individual takes into account certain constraints and opportunities in determining a course of action.

As stated, preference is developed out of an individual's predilections and judgment. His predilections, governed by the antecedent variables and conditions, are filtered and modified by his social interactions. Such variables as age, education, occupation, family structure, motivations, etc. are among the antecedent variables and conditions. The social interactions which mediate the antecedent conditions within the preference process have been discussed by Burch (*2*). He presents and discusses three hypotheses explaining recreation behavior: the compensatory, familiarity (spillover), and personal community hypotheses. These will be returned to later in our discussion.

To summarize to this point, the antecedent conditions, as mediated by social interactions,

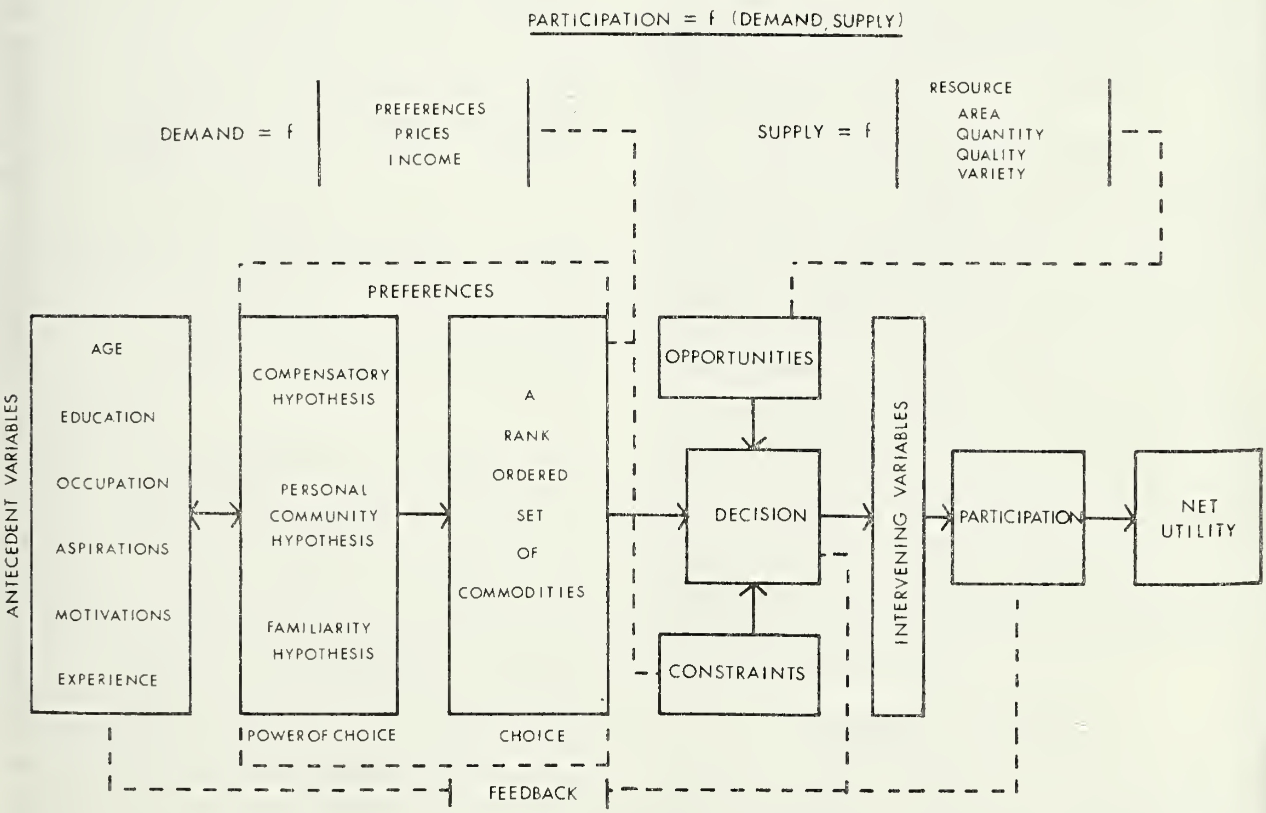

FIGURE 1.

provide the basis for the preference process. The compensatory, familiarity, and personal community hypotheses have been proposed to explain the recreation preference process. Through the preference process, the individual is able to make choice(s). Choice, constraints, and opportunities are combined in the decision process.

The constraints are the price, income, and time variables of the demand model. Opportunities represent the supply side. Traditional economic supply models include representations of resource costs. Because of the extra-market nature of outdoor recreation, however, the supply elements in this model are those viewed by the individual.
outdoor recreation, however, the supply elements in this model are those viewed by the individual.

It is also important to distinguish between decision and participation. Decision is the process of selecting an action or behavior, whereas, participation *is* action or behavior. Between the outcome of the decision process and participation, intervening variables may cause participation to differ from the act or behavior selected by the decision process. These intervening variables would include such things as weather, temporary road conditions, auto breakdown, levels of use at target recreation areas, illness, lack of time, etc. These are conditions of a short duration and are not very important in determining participation in the aggregate, but could cause problems if ignored in empirical studies.

The activity that we observe at a recreation site is participation. As shown in figure 1, however, participation is an imperfect reflection of preferences, choice, and decision due to the mitigating factors noted above. It is also an imperfect reflection of net utility, or satisfaction, the outcome of participation.

Furthermore, participation is activity in a recreational environment. Research undertaken to explain recreational participation has tended to be more concerned with activities than with environments. To the extent that individuals differentiate between activities enjoyed at one site and the same activities enjoyed at a different site, the site-activity combinations represent different products, and the rank ordering of them will differ. By neglecting the environmental dimension, additional and unaccounted-for variation in participation may be introduced, thereby reducing the explanatory power of consumption studies. The model is meant to apply to recreational commodities defined as activities within environments.

Knowledge about the preference process and choice is important to the recreation manager for several reasons. First, the manager can influence choice. The feedback mechanism, as shown in figure 1, exists among all elements of the model, but particularly between participation and the antecedent conditions of experience and skill. Unsatisfactory recreational experiences, those that do not fulfill the *a priori* expectations of the individual, may cause the individual to reorder his choice ranking. The extent to which this will happen depends on the degree of influence experience has on the preference process and choice.

Second, preferences for or choice of recreation commodities that do not presently exist cannot be revealed through studies of participation and demand that do not explicitly consider choice. Therefore, knowledge of choice is important to the planner in determining whether he is failing to provide opportunities for which a preference may exist.

Third, because of the research difficulties imposed by the extra-market nature of publicly provided recreation, participation and demand studies may not provide valid representations of preferences (choice).

Last, and perhaps most important, is the general consideration that the provision of human satisfaction is the ultimate goal of recreation planners and managers. The level of satisfaction that can be provided within resource and budget constraints is directly related to the degree to which the preferences of individuals are being met by the opportunities made available.

The model, then, describes a process of behavior that, in terms of generating satisfaction, is both complex and variable. Several studies have been directed at a better understanding of the preference process and choice determination. The discussion that follows will concentrate on what is known or has been intimated about recreational behavior with regard to the antecedent conditions and the preference process.

Antecedent Variables

In most recreation demand and consumption studies, preferences have been either taken as given, or measures of some of the antecedent variables have been used as proxies for pref-

erences (7, 9, 12, 13).[3] While the relationships shown between these variables and amount or frequency of participation have been statistically significant, they have accounted for a relatively low proportion of the variance. Field and O'Leary (6) fround them to be useful in distinguishing between participants and nonparticipants. Once nonparticipants were removed from their analysis, however, these variables explained little of the variance in the frequency of participation. Note that these variables are the ones used most often in forecasting recreational use.

Direct Measures of Preferences

Because of the relatively weak correlations between antecedent variables and participation, the junior author has attempted to develop explicit measures of preferences that could be used directly in demand and participation analyses (15). A sample of forest recreation visitors was asked to rank their preferences for the six activities they most preferred. An activity preference typology was derived through factor analysis and consisted of three preference factors. Factor scale scores for each of the preference factors were calculated for each respondent and entered as dependent variables in a multiple correlation analysis with socioeconomic characteristics. The results indicated a statistically significant, but weak, relationship between each of an individual's three scale scores and his socioeconomic characteristics. In a stepwise regression analysis, however, the amount of time spent in various activities was not found to be significantly related to the preference scale scores (a supposed direct measure of preference). And yet, socioeconomic variables employed as proxies in the traditional manner were weakly, but significantly, correlated with the amount of participation. Assuming that preference was adequately assessed by visitors' activity rankings, this supports the concern that socioeconomic variables are not strong proxies for preference.

To pursue this further, we took a similar approach in a corollary study of households in six population centers in Arizona. Again, the factor analysis resulted in three preference factors, but not the same three for each population center (revealing the possible influence of different supply opportunities and different antecedent conditions on preference). Preliminary results for the Phoenix population indicate significant correlation between preference factor scale scores and socioeconomic variables. In this case, however, a significant correlation was obtained between the direct preference measures and frequency of participation. Research on this subject is still in progress.

Another study designed to measure preference directly was conducted by Peterson and Neumann (14). They attempted to estimate preference functions for recreational beach environments. The results showed that two groups existed, having different beach preferences. One group, the larger, preferred beaches that were natural, scenic, and uncrowded. The other, smaller group preferred city beaches and was sensitive to sand quality and the visual attractiveness of surrounding buildings, but didn't seem to mind crowding or lack of greenery. Although unable to explain reasons for the differences, Peterson and Neumann found that the two groups used the beaches for different purposes and the group preferring the scenic, uncrowded beaches was older and more educated than the other group.

The Preference Process

There have been a number of studies in which various antecedent variables have been investigated to provide a more precise determination of their relationship to the kinds of activities people engage in and the environments within which the activities occur. As mentioned previously, Burch (2) has presented three hypotheses as explanations of recreation behavior. We will discuss the state of the knowledge regarding the preference process with regard to each of these hypotheses.

Compensatory Hypothesis—"*The compensatory hypothesis suggests that whenever the individual is given the opportunity to avoid his regular routine, he will pick a directly opposite activity*" (2).

Driver, Knopf, and Carson (4) have been developing scales to measure recreation user motivations. They consider their work a preliminary assessment of what sorts of information can be gained about recreational behavior through the use of such scales. They conclude, however, that stressful conditions in the home, neighbor-

[3] These citations certainly do not exhaust the literature in this field, but are representative of the approach.

hood, and job environments of an individual are related to the individual's participation in various recreational activities. This lends support to the compensatory hypothesis. Their results also indicate that recreational activities and environments may fulfill desires to learn, explore, develop skills, meditate, and develop identity. If the opportunities to achieve these desires are missing from the home, neighborhood, and job situations, then the compensatory hypothesis is again supported. While these results are preliminary and subject to some qualifications, the approach seems to be useful for learning more about the preference process.

Knopp (*10*) tested the compensatory hypothesis with respect to recreational environments. While controlling for access to and knowledge of alternatives, he compared the desired environmental elements of urban and rural residents of Winona County, Minn. His results indicate support for the compensatory hypothesis. The rural farm residents were more interested in social interaction than urban residents. Urban residents and those rural residents who had a great deal of human contact in their job environments tended to be more interested in solitude than did rural residents.

Knopp (*10*) pointed out that recreational environments are not simple homogeneous entities. Any environment is made up of a complex of elements and a recreational visitor may be searching for one or more of these elements. This may explain the apparent paradox of the camper who has brought all of the comforts of home with him and declares he camps to get back to nature.

Independence, or freedom, was found to be a valued element of recreation in Knopp's study. Information of this sort is important to land managers when considering means for controlling and directing recreational use within recreational environments.

Familiarity Hypothesis—"*. . . The familiarity hypothesis suggests that when given the freedom to dispose of his time, the individual will seek activities which continue his familiar routines*" (*2*). Shepard (*16*) has referred to this as the "spillover" hypothesis.

Yoesting and Burkhead (*18*) studied the relationship of childhood recreation experience, an antecedent variable, to adult recreational participation. They found that childhood participation levels were significantly related to adult levels, where participation was measured as number of activities engaged in during a year. The place of childhood residence was found to be unrelated to the number of activities engaged in as an adult. And, no relationship was found between childhood residence and the proportion of adult activities that had been participated in as a child. The number of childhood activities, however, predicts the number of adult activities that had been engaged in as a child. They found support for the hypothesis that a childhood activity is more likely to be engaged in as an adult than not. In a longitudinal (over time) sense, this study lends support to the familiarity hypothesis.

The study was exploratory and further research should be done along these lines but with a measure of participation that reflects the intensity and place of participation rather than just the number of activities engaged in. These results are important to the manager because they indicate that it may be possible to project future recreation preferences on the basis of surveys of children.

Personal Community Hypothesis—"*The personal community hypothesis assumes that gross social issues and psychological drives are significantly filtered and redirected by the social circles of workmates, family, and friends*" (*2*).

Burch (*2*) finds support for the convergence of the compensatory and familiarity hypotheses with the source of that convergence being the social interactions that take place in an individual's occupational, family, and friendship circles. For example, he found that a husband's leisure socialization by his parents was apparently important in influencing his adult behavior. But the husband, in turn, influences the wife's behavior.

The influence of an individual's personal community and other characteristics on levels of recreation participation was tested by Christensen and Yoesting (*3*). The dependent variable was the number of outdoor activities engaged in during the previous year. Stepwise regression was used for a multivariate analysis of the variables. The variables found to be statistically significant in their relation to the number of activities engaged in by an individual were: number of childhood activities, age, number of activities engaged in by friends, education, recreation facility expansion attitude, income, leisure orientation, and occupation. The same variables were found to be correlated with the number of activities engaged in by

the individual's family, but the relative importance of the variables in explaining behavior changed. While these results may not be directly usable by managers, they do provide guidance to researchers for improving the demand and participation analyses that ultimately serve managers.

Field and O'Leary (*6*) found that when the type of recreation group (family, friends, or family with friends) was included along with socioeconomic variables, the proportion of variance in participation explained was significantly increased. We have found similar results in a study of forest recreation visitors in Central Arizona.[4] This supports Burch's contention that we will be more likely to find explanations of recreational behavior by looking at recreation parties as social groups than simply as aggregations of individuals.

It is important for the manager to recognize that his clientele may be made up of at least three types of social groups. The desires, activities, and behavior of these groups will differ and need to be considered in management. For example, the space needs of groups consisting of friends may be greater than those of families. We have found that groups of friends engage in different activities than do families and families with friends. Friends tend to engage in energetic group activities such as volleyball and softball.

Conclusions

It is apparent, from the model and the empirical studies reviewed, that we still have much to learn about recreational behavior in general and about choice in particular. Further, it is clear that recreational behavior is a complex phenomenon and learning more about it will require more sophistication in research design than has been the case. The manager should recognize this complexity and take it into account when assessing the applicability of research findings and when cooperating with researchers in developing research projects.

We think it should also be clear that, in our view, there will have to be more multidisciplinary research, or at least recognition and use of results from other disciplines, if we are to make significant progress. The economist cannot ignore the contributions, actual and potential, of other social scientists towards explaining recreational behavior. Nor can recreational behavior be adequately explained if the economic aspects of such behavior are ignored.

In the face of incomplete and inaccurate information, managers must make decisions. They should do so with the knowledge that some of their, and our, pet theories may be found to be wrong. Therefore, managers must continually reevaluate their decisions and perceptions of management situations to avoid developing a recreation management folklore. In sum, the manager must be alert and flexible.

While some of the research results cited may not be immediately applicable to a management situation, they do support a conceptual context of management; planning for recreational use of natural resources requires consideration of attitudinal and behavioral processes of participation. Furthermore, and very importantly, they provide a basis for further study of recreational behavior.

Because of the complexity of recreational behavior, all studies have had to control on more than one variable and the results, therefore, lack comparability and generality. For example, in order to control for knowledge and opportunity among individuals, Knopp (*10*) studied a very specific population, residents of one county in Minnesota. Therefore, his results may not be applicable to other populations. More replication is needed before generalizations about recreational behavior are possible.

The studies reviewed here have "entered" our heuristic model at different points and are all, in one way or another, attempts at explicating the behavior process. Unless we can assume that we know more about what the public wants than they do, we must continue to seek "determinants" of preference as well as expressions thereof. The search for both an understanding of these processes and the means to apply them in management decisions is ongoing, although success is hindered by the complex relationships involved.

It will be some time, therefore, before the manager can expect research to provide more complete information about the recreational behavior phenomenon. And if the goal of more complete explanations of recreational behavior is ever to be approached, social science researchers of all disciplines will have to cooperate to a greater extent than in the past.

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[4] Unpublished data on file in Department of Watershed Management, The University of Arizona, Tucson.

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ECONOMICS AND ADMINISTRATIVE REGULATIONS OF OUTDOOR RECREATION USE

Kenneth C. Gibbs [1]

Outdoor recreation today is experiencing unprecedented popularity. More Americans are enjoying the out-of-doors than ever before, due partly to factors such as more leisure time, higher incomes, and perhaps, most importantly, to changes in desires and goals. The work ethic held by many in the past is rapidly giving way to other uses of time. This is particularly true of people nearing retirement age.

In the past, governmental bodies were the only ones in charge of providing facilities to satisfy what has developed into ever increasing demands by recreationists. The Federal government established the National Parks and Forests, State governments the State parks and camping facilities, and local agencies the city parks, playground areas, and the like.

Why has outdoor recreation been dominated by public interests? The answer stems from the marketability aspects of recreation. When a product is indivisible, in the sense that once it is provided for one individual it is automatically available for others, it cannot be marketed by charging a price to use it. National defense is a good example of this phenomenon. It is impossible to protect the nation for some people and at the same time not for others. Thus, governmental tax revenues must be utilized for defense, as long as it is desired by society. So it is with outdoor recreation; society deems it to be important, but in many instances if it were provided for one recreationist, it would also be available for many more. A road built into an attractive forest serves as an example.

Also at the heart of the non-marketability aspect of outdoor recreation is the fact that the cost of admitting another individual, after the area is established, is near zero. A market price, based on sound economic principles, would also be near zero. This is perhaps at the root of the reasons for charging nominal or no fees at many recreation areas.

[1] Associate Professor of Agricultural Economics, Food and Resource Economics Department, University of Florida, Gainesville, Fla.

The combination of low fees and vastly increased demands is causing problems. One such problem is overcrowding, imminent when these two conditions are coupled. With overcrowding comes the need for regulation to preserve the quality of the scenery of forests and the wilderness life for the people. When millions of people drive automobiles into parking lots of our parks, not only is air pollution a serious problem, but also the quality of the recreational experience is severely deteriorated.

The solution to this problem rests on our ability to alter the supply of or the demand for outdoor recreation. Either direction requires regulation. The most prominent form of regulation is a fee. Other forms of allocating scarce resources are available, but diverse in nature. Examples include drawings in which the privilege to attend a recreation area is won. Diverting the crowds to private sources of outdoor entertainment, eliminating vehicular traffic in certain areas via mass transit systems, and guided tours are among other solutions posed. Fees must enter the discussion at all points as an effective allocative mechanism. Concentration in this paper is on price, but sight should not be lost of other forms of regulations.

The objective of this paper is twofold. First, the establishment of outdoor recreation as an "economic good" and, in turn, the clarification of some economic concepts will be undertaken. The second primary objective is clarifying the role of economics in administering outdoor recreation. In addition, a plea is made for more research to assist planners and managers in making rational decisions.

What is Outdoor Recreation?

Prior to a discussion of solutions to the "problem" in outdoor recreation, it must be clear what is meant by "outdoor recreation". Lawn bowling, backpacking a wilderness area, hunting, fishing, sightseeing, shuffleboard, camping, Disney World, and the like are all included under the classification

"outdoor recreation". It is obvious that an effective policy (be it a regulation or whatever) for one group of recreationists may be irrelevant for another.

In all too many instances, reference is made to recreation as if it were a homogeneous quantum. Most refer to the National Parks and Forests in their arguments. But many controversies arise due to varying definitions of outdoor recreation itself. It should not be implicitly assumed that reference is made to one or a few of the many facets of recreation; a specific type should be identified at the outset of a discussion or analysis.

Reference is constantly made of the seemingly archaic notion that "recreation" must be a non-marketable commodity. Here again, if recreation were properly defined, little disagreement might arise. The existence of privately-owned and operated recreational areas must surely be evidence a role does exist for private enterprise. In Florida, for example, approximately half the outdoor recreation facilities are privately supplied (4). In the West, this phenomenon does not exist to this extreme, but even there the private sector plays a supporting role. It must be stressed that the supplies of outdoor recreation provided commercially and publicly are interrelated and cannot easily or meaningfully be separated from each other.

True, the unique natural phenomena such as Yellowstone, the Grand Canyon, and certain wilderness areas will still be available through the public sector. The trend in recreation today must seriously be investigated, however, before one concludes that the unique resource-based facility is all that should be provided. User-oriented facilities are becoming more popular.[3] This is exactly where private interests will be most prominent, because a market exists. Entry can be restricted and the extra cost of providing electricity, showers, restrooms, swimming pools, etc., to an individual can be computed.

For the remainder of this paper, attention will be focused primarily on resource-based, publicly provided outdoor recreation facilities. Arguments and conclusions, while equally applicable to other forms of the recreation sector, will be aimed at the publicly provided facilities since widespread belief holds for the inappropriateness of economics in these cases.

[3] Resource-based recreation differs from user-oriented in that the location of the former is dependent on some aspect of the natural environment. User-oriented is generally located for the convenience of its clientele.

Role of Economics

Some maintain that economics is of limited usefulness. Others, while recognizing its use for goods found in the market place, find it difficult to conceive its role for commodities such as outdoor recreation, esthetics, wildlife maintenance, etc. Still others, mostly economists, argue that even though no formal market exists in certain areas, economics is still relevant.

What is the cause of this vast array of opinions regarding economics? It surely must ultimately stem from different conceptions of economics itself.

What is Economics?

Economics is many things to many people. A general definition seems useful for purposes of this paper. "Economics is a science dealing with human behavior in regard to satisfying wants by utilizing scarce resources." Nowhere in this definition were prices mentioned, nor indeed do they need to be. Economics involves tradeoffs; giving up some scarce resources (labor, income, ideas, etc.) to obtain other scarce resources (goods and services). Money is generally used as a common denominator to express the relative worth of resources.

Economists observe individuals, in and out of the market place, and analyze what they give up to get commodities to increase their satisfaction. In this way, a lower bound on value can be estimated. For example, if an individual paid 1 dollar for a pound of butter, it can be concluded that that commodity was worth at least 1 dollar to him.

What does this discussion have to do with outdoor recreation? In an efficient market, buyer's desires recorded in terms of dollar votes are registered to sellers who in turn react by altering production. If consumers respond favorably, by a willingness to pay higher prices, then this is a signal to producers that more resources should be invested in that commodity due to its profitability. In this way, resources will be allocated in the most efficient manner, and priorities will be established according to consumer's willingness to buy and producer's willingness to invest.

In the absence of a market, allocations of scarce resources (public funds in this case) are still allocated according to priorities. Priorities are often

decided, or perceived, based on too few facts. In order to wisely allocate resources among alternative uses, the value of the alternatives is needed. Information on the demand for outdoor recreation is one of the most sought after facts to assess the relative importance of this use of public funds. Economics offers a method for objectively determining a value for outdoor recreation so that funds may be wisely allocated. Establishing the demand for recreation is a first step in the valuation process.

Demand for Outdoor Recreation

A demand curve is a schedule relating willingness to pay for various amounts of a commodity. The interpretation of demand is not altered in the absence of a market; however, procedures to estimate demand are appreciably different [see *3*, *7*, *12*]. It is beyond the scope of this paper to focus on demand estimation; but related suggestions are presented in subsequent sections. For now, demand is assumed given.

From a demand curve, two useful estimates are available: a measure of value and a measure of the responsiveness of consumers to price changes. Two of the most prominent measures of value used in the outdoor recreation field are total expenditures and consumer's surplus.

Total expenditures are clearly defined and generally the easiest of all measures of value to estimate. One merely needs to multiply the price paid by the quantity consumed. This is illustrated by the shaded rectangle in figure 1. Total expenditure is also a measure of the revenue received by the seller, for example, revenue from camping in the National Parks.

In order to predict the reaction to a fee change, more than one point on a demand curve is needed. If expenditure data were the only information available, then only one point on the demand curve would be provided. The use to recreation managers would be severely reduced. What is the impact on total revenue of an increase in price? The answer depends on the shape of the demand curve—a concept called elasticity. Elasticity combines the location of a particular point on a demand curve with the slope of the curve. If consumers are responsive to price changes in that they will significantly alter their consumption patterns, total revenue will decrease correspondingly to a price increase. In other words, their consumption will decrease more than the price increase. If, however, consumer's reactions are small relative to a price change, total revenue will increase with an increase in price.

This latter situation characterizes most outdoor recreation. The demand for outdoor recreation is said to be inelastic, implying that the percentage change in days taken is smaller than the percentage increase in user fees. There is a limit to how far price can be increased and still maintain an inelastic response for most commodities. The elasticity of demand for specific outdoor recreation areas needs to be known for effective, efficient management. Even if increased fees are thought to be undesirable for reasons other than efficiency, it is important to be aware of the revenue foregone when not charging higher fees. In this sense, rational decisions concerning budget allocations can be made while accounting for potential revenues.

The other often used measure of value, consumer's surplus, has been preferred by most economists over the expenditures measure. Total expenditures do not measure the willingness of recreationists to pay for a commodity. The value of an item is really how much a person is willing to give up (pay) to get the item. A demand curve is a reflection of how much money an individual is willing to part with to consume various amounts of a commodity. It is for this reason that an accurate measure of value should be read off the demand curve, not merely how much was paid.

An example is perhaps the best way to understand consumer's surplus. At a price of $7, the hypothetical consumer represented in figure 2 would not consume any of this commodity, say a sport shirt. But, at $6 he would buy one. Put in other terms, he would be willing to pay $6 for one sport shirt. Assume that the price is only $3. This consumer is then receiving $3 worth of satisfaction for which he did not have to pay. To continue, for the second shirt he is willing to pay $5, but must again pay only $3. Thus, he has an additional $2 of excess benefits. The example continues analogously up to (in this example) four shirts. At this point, he is willing to pay exactly what he is charged. Thus he has no excess benefits for the fourth shirt purchased.

Consumer's surplus is the sum of the excess benefits received for all units of the commodity. It is defined as the shaded area in figure 3. It should be emphasized that this measure of value is over and above the actual expenditures. It is a form of net benefits, with the costs (or actual expenditures) subtracted out.

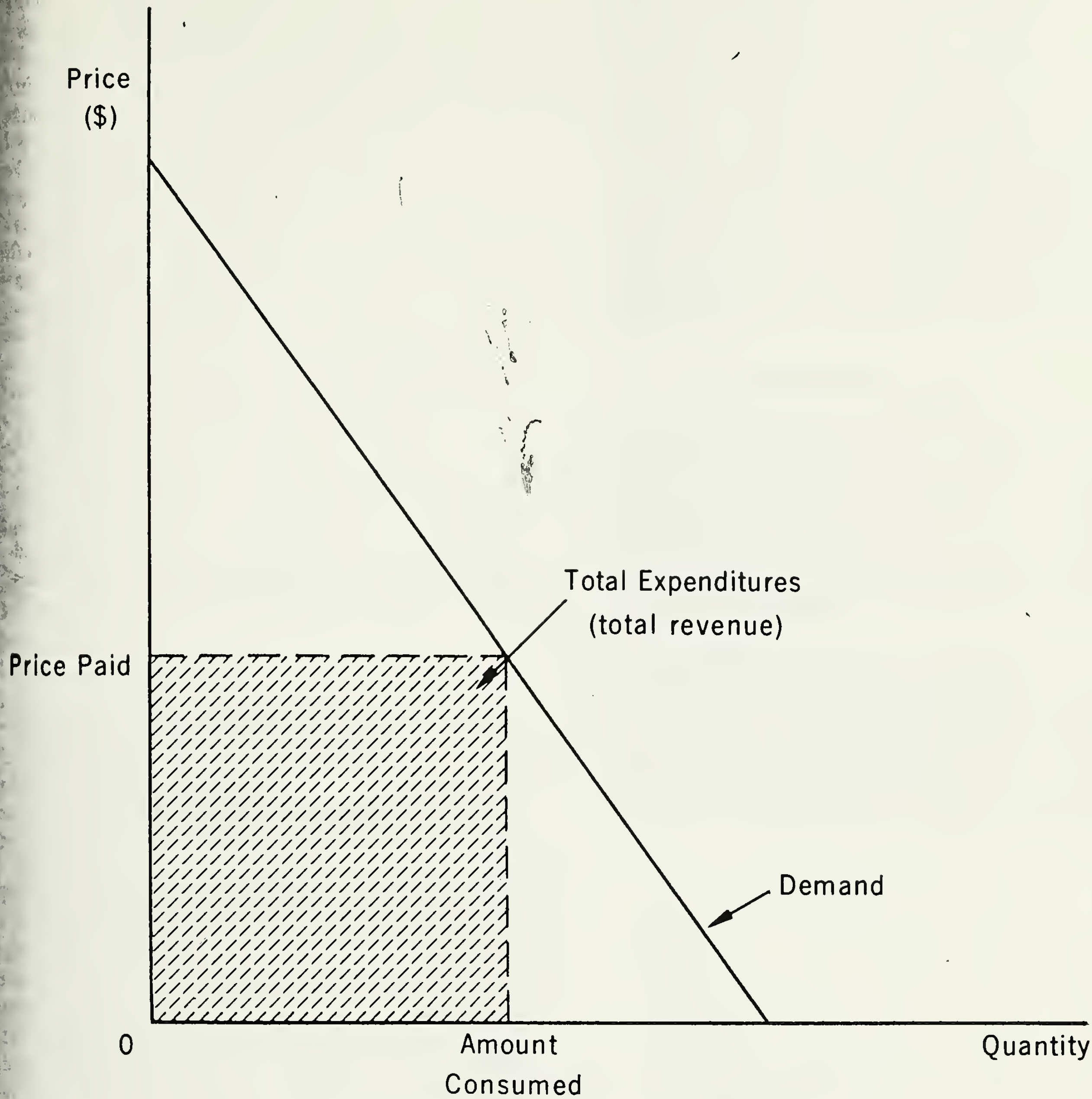

FIGURE 1.—An illustration of total expenditures.

Without the existence of a market, actual on-site costs (costs incurred for rental items, food, lodging and other costs incidental to site recreation) can be used as the price variable in a demand curve (see *3*, *6*, *7*, *8*, *9*, for examples). Consumer's surplus is a measure of the additional amount a recreationist would be willing to give up rather than be excluded from the experience. His consumption will decline as he is forced to pay more. The extent of his adjustment in quantity depends, as before, on the shape and relative location (elasticity) of his demand curve.

Why Evaluate Outdoor Recreation?

Whenever a commodity becomes scarce—in that at a given price consumers demand more

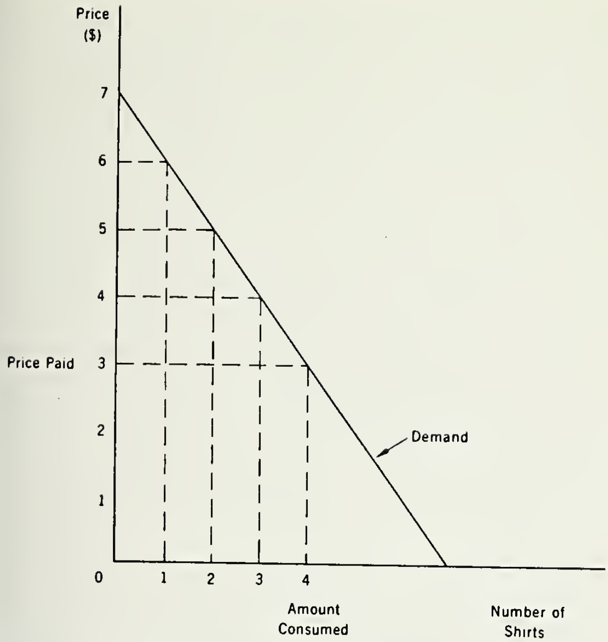

FIGURE 2.—Hypothetical demand to compute consumer's surplus.

than is available (evidenced by crowding at outdoor recreation sites)—it becomes an "economic good".

In a market, price serves two important functions. First, it allocates the commodity to those willing to pay the price. Thus, those to whom the good is not worth as much as the asking price will not be willing to purchase it. Others will buy up to the point where the cost of the last unit will exactly equal the value of that unit. If more and more consumers enter the market, for a given supply, the price will go up to ration existing quantities to those for which it has value. The effectiveness of price as a rationer can be demonstrated to be dependent on the responsiveness of the consumer (elasticity). Its effectiveness varies from one commodity to the next.

The second function of price is its signal to producers. As consumer's preferences change, reflected by a shift in the demand for a commodity—for example, by an increased willingness to pay—this signals producers that higher returns may be possible by increasing the production of these commodities. The market will allocate more resources to those activities where returns are higher and fewer to those in which demand has fallen. The flow of resources will continue toward those with increasing demands and away from those with declining demands.

The discussion of price up to this point was in reference to a market. In the absence of a market, knowledge of the demand for a good or service is not automatically known. Budgets are allocated by political means. If society values certain forms and locations of outdoor recreation, it should be represented in budgetary support. Knowledge of the demand for outdoor recreation is needed to represent society's preferences toward this nonmarket good.

Fees for Recreation

Traditionally, recreation was thought to be a free service provided by governmental agencies. The question of whether fees should be charged is disucussed today with frequency and emotion. It is the position of this papre that fees should indeed be charged. Arguments in support of this position are considered in the discussion which follows.

As previously mentioned, price acts as an allocative device, raises revenues, and guides investment to more productive endeavors. The efficacy of price, or fees, as an allocator or revenue generator hinges on the responsiveness of recreationists. The demand for outdoor recreation in

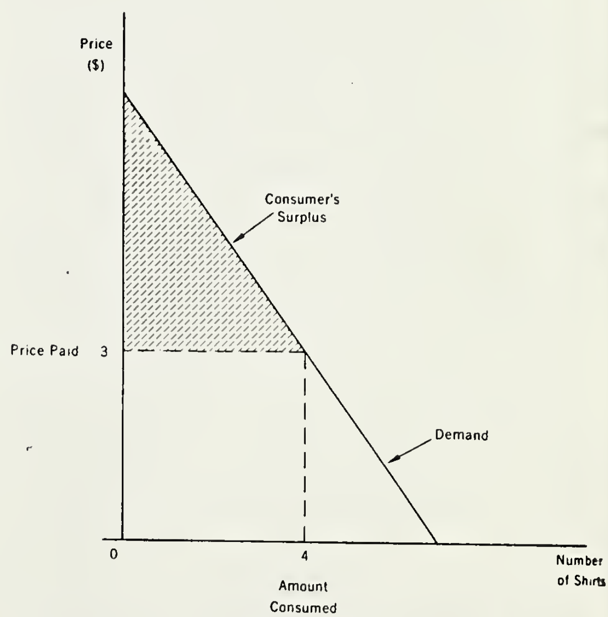

FIGURE 3.—An illustration of consumer's surplus.

general, must surely be inelastic (small response to price changes) within a reasonable range of fees. There is much empirical evidence to support this hypothesis. Should fees not be charged then, based on the "non-responsive" nature of recreationists? One point needs clarification before this conclusion is accepted. The measure of responsiveness, elasticity, relates the relative change in consumption compared to the percentage change in price. If fees were raised merely $1, for example, this would constitute a 33 percent increase in a $3 camping fee (prior to considering other on-site costs). So the response of the recreationist need only be a cutback of less than 33 percent to be considered a "non-responsive" change. But surely a 10 or 15 percent reduction in use would be substantial.

An example from a 1973 study of Florida's State park system (*10*) may be helpful here. In 1973, an estimated 10.7 million visitor days (12-hour periods) were experienced in the 36 State parks located throughout the State of Florida. For a 10 percent change in on-site costs, including fees, an estimated 4 percent reduction in visitor days would ensue. Thus, for a $1 increase in camping fees, approximately 253,000 fewer visitor days (12-hour periods) would be observed in the park system. Can this be considered non-responsive? On a percentage basis it would, but in the absolute it still constitutes a significant reduction.

This hypothetical dollar increase in fees for Florida's State parks would, on the other hand, provide an additional $1.3 million in revenue. This brings up a very important point. A $1 increase to a recreationist must surely seem less than monumental after having already purchased thousands of dollars worth of equipment and perhaps over a hundred dollars in travelling en route and return. The average camper at Florida's State parks has an annual income of $15,000 and drives 1,360 miles round trip to camp.

The additional revenue generated by a fee increase could be used to develop more areas in order to relieve the overcrowding problem so prevalent in recreation. In addition, if public agencies would charge fees to *at least cover* costs, an incentive for private investment would be enhanced. Thus, a further release of crowding pressures results by increasing the supply. But private funds cannot be relied upon when competing with nominal fees of public agencies. Without fee increases, overcrowding will continue and the quality of the experience, especially in attractive forested areas, will decline. Investments should be guided to where returns are the highest in order to most efficiently and equitably allocate resources.

An argument frequently given in opposition to charging fees at public facilities is that the practice discriminates against the poor who would be the first to be priced out of the market. To assess the validity of this charge, more information must be known about the recreationist himself. The results of the State park study showing an average income of $15,000 are not uncommon in other States (see *1*, *2*, *3*, *5*, *13*, *14*, *15*). The distribution of this income is heavily weighted to the nonpoor. It would be conservative to conclude that less than 5 percent of these campers were considered to be financially weak (*10*).

If the public is indeed concerned about the poor or underprivileged, a program should be instituted to provide much more than merely low priced camping. If the poor would in fact be interested in recreation, then perhaps a program to provide equipment and transportation subsidies in addition to free camping would be in order. Revenue generated by those able and willing to pay the fee could be used to sponsor such a program. But free or low-cost recreation financed from general revenues amounts, in essence, to subsidizing the not-so-poor. Is this a goal society believes to be valid? It is doubtful. Outdoor recreation is itself an unsatisfactory area to be helping the poor.

The exact level of a fee cannot be decided for recreation in general. Again, it depends on the individual situation. Revenue from users should at least cover the variable costs of operation. Fees should be set according to: The quality and services provided; by season, depending on the demand, to encourage more uniform usage; and by geographical preferences of recreationists. That is, the fee should be based on the willingness-to-pay of the area's users. In order to do an effective job of fee setting, information about the recreationist must be known, the most important of which is his demand. The fee should be consistent with goals of the governing agency. If economic efficiency is the only prevalent goal (which is unrealistic), then fees should be set to maximize returns. If, on the other hand, other goals are relevant, then fees should also reflect them. It should be clear that the position of this paper is

not that economics should play the sole, or even dominant, role in regulating recreation use. Merely, it is that the economic impacts of certain decisions should be known in advance. Then allocations can be made with as many facts as possible, including economic, social, and political.

The impact of a fee on a recreationist's cost per day at the site and on merely the total cost of the trip regardless of his length of stay should be known. It was found in the State park study that an increase in daily on-site costs reduced the number of days the average recreationist visited the site per year. In contrast, an increase in travel cost decreased the number of trips but increased the length of stay per trip (to get their money's worth) to an extent that the total number of days per year for the average recreationist actually increased. But congestion would be reduced since fewer recreationsists would be staying more days. The impact of a change in on-site costs is still different from that of a change in travel costs.

Summary

In summary, overcrowding caused in part by low fees and increased demand is a prominent problem encountered in planning and managing outdoor recreation facilities. Scarcity thus exists, establishing outdoor recreation as an economic good although not possessing all the characteristics of a marketable good.

The position of this paper is that users of a facility should bear at least the major responsibility in financing its operation. Price plays a role in regulating use, providing revenues, and encouraging private funds in the area where returns are profitable. Efficient allocation of public funds is needed (1) between types of outdoor recreation, (2) among recreation locations, and (3) among other uses. This must be accomplished with increased knowledge of the demand for recreation. In this sense, the relative value of recreation can be compared to alternatives. When recreation is provided at costs substantially lower than willingness to pay, society experiences a misallocation of resources.

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CRITERIA FOR EVALUATION OF RECREATION PROJECTS

H. M. Gregersen [1]

Development and use of criteria is critical to evaluation of the economic and social acceptability of outdoor recreation projects and programs. As most frequently considered, criteria are standards or rules against which comparisons can be made when making choices and decisions regarding recreation policy. Criteria serve three rather distinct purposes in connection with recreation policy, namely, for choosing between objectives, for choosing between courses of action, and for evaluating the effectiveness of courses actually followed. While criteria for all these purposes are essential ingredients of the evaluation process, the focus of this discussion—as defined by the symposium organizers—is on criteria to serve the latter two purposes. Since the symposium deals with the application of economics, we will emphasize economic criteria. We concentrate on evaluation procedures and criteria related to public projects, both because this is more of interest to the participants here and because the evaluation process and criteria for private (commercial) projects are much better known and established in the standard investment analysis literature.

Definitions and Concepts

There are a number of economic efficiency measures commonly used as criteria for evaluation of public projects. These include measures of: (a) Cost-effectiveness, (b) relation of expected total costs to total benefits, (c) net present value, and (d) rate of return. The criteria used in actual practice tend to be of the cost-effectiveness variety, which require dollar measures for costs, but only physical estimates for recreation use (benefits). This effectively eliminates the difficulty of agreeing on dollar measures for recreation benefits. (The other three types of measures all require dollar values for benefits in addition to costs).

The disadvantage of cost-effectiveness criteria is that they cannot always be used to compare one use with other non-similar uses for funds, e.g., it is difficult to make *economic* sense out of a comparison of number of swimmers served per dollar of expenditure on beaches with number of cross-country skiers per dollar's worth of trails provided. These criteria can be used effectively when the outputs are the same.

Economists sometimes take their evaluation criteria too seriously. Obviously, in a "real world," political context, where imperfect information and confusion are the rule rather than the exception, and where efficiency is not the only concern, the result of using rigid, narrow criteria can result in gross nonsense. We, therefore, have to broaden our concept of criteria to explicitly include "consistency" and "workability" as two constraints that should have equal consideration along with the economic efficiency criteria discussed above. The consistency constraint simply means that a given project, to be acceptable, must be in harmony with whatever other programs exist for the area, region, etc., within which a project will exist. To be workable, a project must accomplish agreed-to objectives in the context of the various political, social, cultural, religious, budgetary, administrative, etc. constraints and norms that exist.[2] Examples of projects that are economically efficient but ridiculous in terms of consistency and workability are numerous and probably familiar to everyone working in the field.

Criteria for making judgments may be quite different, depending on whether we are talking about program evaluation or project level evaluation. For example, at the program level, the overall objective might be that a part system or outdoor recreation program should maintain or enhance the natural beauty and condition of the State or other political/administrative area. Those not involved in decisionmaking might argue that the logical criterion for inclusion or exclusion of a given project is whether or not it accomplishes this objective. However, this in not an operational criterion. *How* do we decide whether a given project (namely, a park) enhances the natural

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[1] Associate Professor, College of Forestry and Department of Agricultural and Applied Economics, University of Minnesota, Minneapolis, Minn. (The author gratefully acknowledges the comments of Joe Massey and Paul Ellefson on earlier drafts of this paper.)

[2] For example, there may be political considerations related to distribution of benefits from recreation projects.

beauty or conditions in the State? What are the standards or criteria for judging this from a project standpoint? Even if we can develop a satisfactory answer to such questions, the decision-making problem does not end here, since there may be many possible alternative projects that could contribute to maintaining or enhancing the natural beauty of the State. Given a limited budget, we have to ask: what combination of projects will contribute most to achieving the objective, i.e., what are the criteria for setting *priorities?* There are likely to be a number of political and social constraints placed on the optimum solution to meeting a particular objective. For example, elected officials may require a certain regional distribution of expenditures for a program and may require that a certain minimum number of persons in each region benefit from the expenditure of a limited State budget. These contraints introduce the need for consideration of trade-offs and the need to rank projects on the basis of a number of criteria.

Two levels of decisions exist for which criteria are needed. First, *they are needed as guides for exclusion or inclusion of projects* among the group of acceptable and feasible alternatives—i.e., does a given project proposal meet the established minimum program criteria or doesn't it? Second, for those projects which do meet the minimum criteria, *they are needed to rank projects or establish priorities* for investment and development within a given program context.[3]

In practice, we tend to use a whole series of criteria or conditions for determining whether a particular project should be included in a program. From a practical standpoint, it is an illusion to think that we can develop one, universal criterion (e.g., a benefit-cost criterion) for deciding whether a project merits initial selection as one of the feasible and efficient alternatives for meeting program objectives. Further, there are a number of criteria, not just one, which have to be specified in the process of setting priorities among projects which fit the program criteria. The whole process can become extremely confusing, and particularly so if, as is usual, objectives are not adequately specified.[4]

With these concepts and definitions as background, we can now turn to consideration of what actually happens in practice and some of the ways in which improvements can be introduced into the recreation project and program evaluation process.

The "State of the Art"

A logical way to get at the present "state of the art" is to ask those who practice the "art". Thus, the next part of this discussion deals with recreation project evaluation procedures and criteria used by State agencies dealing with recreation. The discussion is based on documentation received from some 46 States in response to a request sent to all States. The response was gratifying and we take this opportunity to thank all those State officials who provided detailed information and in many cases examples of project studies and evaluations.

The following five queries were made of State institutions dealing with recreation project development:

1. Please outline the approach you use in identifying, preparing, analyzing, and evaluating outdoor recreation projects. (It would be helpful if you could send us an example of what you consider to be one of your better project evaluations).
2. In analyzing a potential new recreation project, or expansion of an existing one, do you make forecasts of expected use, and if so, what forecasting approach(es) do you use?
3. To what extent has your State attempted to quantify recreation benefits for use in project analysis and evaluation?
4. What *criteria* do you use in justifying projects? (e.g., public cost per expected user day or other unit; *availability* of similar opportunities (facilities) in the area of the proposed project, etc.)?

[3] Idaho has a particularly clear definition of the two needs. They call them "primary" and "secondary" criteria. See Idaho Department of Parks and Recreation, Procedures to identify and evaluate areas of outstanding natural, scientific, cultural, historic and recreation value (no date).

[4] There are those who like to talk about "multiple objective functions". In practice, we tend to work with a single objective with other important considerations being specified as constraints. This is consistent with the discussion above, since most criteria turn out to be nothing more than constraints.

5. Please include any other relevant information on project analysis or evaluation criteria which you think might be useful for the purposes of the seminar workshop mentioned in my letter.

In the following discussion, we first briefly summarize the results. Second, we discuss the elements in common among State procedures and criteria. Third, we look at some of the unique and promising approaches identified.

Project Analysis and Evaluation Approaches

The levels of sophistication in planning vary greatly among States according to the results of our survey. In one case, the director of State parks informed us that when areas were proposed for inclusion in the system, he and his staff went out and decided whether the area was "suitable" if so, they recommended it for inclusion. At the other extreme, some States use highly complicated systems of analysis and evaluation that include environmental as well as economic analyses and include various quantitative approaches and public input. Most States have planning systems somewhere in between these extremes.[5] At the State level, they include inventories of existing and potential areas, various types of forecasts of demand or potential requirements (which only in some cases include explicit consideration of potential out-of-State use), and some procedures for comparing supply with demand. At the project level, most States tend to use demand estimates based on comparisons with use of existing similar areas. On the supply side, they consider various physical and esthetic aspects of a proposed area and attempt to estimate an optimum or maximum capacity for the area in question, using past experience and various use guidelines as criteria. Costs are sometimes brought in by considering persons served per day or per year per dollar of expenditure.

Many States replied that their planning process is guided by the Bureau of Outdoor Recreation Guidelines for Statewide Comprehensive Outdoor Recreation Plans (SCORP).[6] The obvious reason for following the guidelines is that close adherence will in all likelihood make them eligible for acquisition and development grants from the Land and Water Conservation Fund (LAWCON funds).

Finally, part of the planning process involves identification of areas for potential inclusion in a State park or recreation system. Some States rely primarily on State agency personnel (in some cases "interdisciplinary teams"); others use any and all sources of suggestions—the public, legislators, local community governments, other agencies, consultants, etc. Since the BOR guidelines require a Statewide recreation area inventory, potential area data is available without too much additional effort. Of course, this does by no means imply that all potential areas are identified in one survey, and the problem of establishing priorities still remains. But this is all part of the planning process, which should be a continuous activity.

Forecasts of Expected Use or Demand [7]

Most States make some attempt to forecast expected use or potential participation rates which they then term the "demand" for recreation facilities and areas. The BOR guidelines specify a planning period between 15 and 30 years for supply and demand forecasts. Most States adhered to this requirement with the majority closer to 15 years than to 30.

The approaches used in forecasting demands fall into three categories: 1) Surveys which ask people what they want; 2) forecasts based on use trends in existing areas; and 3) more complex approaches which may consider use trends in relation to population trends, income growth, travel time and expenses, plus other considerations.[8] In general, the types of sophisticated approaches suggested in the literature [9] are not used

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[5] There appears to have been progress since the Comptroller General of the United States issued its 1972 report to Congress: *Greater benefits to more people possible by better uses of Federal outdoor recreation grants.*

[6] Bureau of Outdoor Recreation, Land and Water Conservation Fund, Outdoor recreation grants-in-aid manual, Revised December 1973.

[7] See also Rabel Burdge and John Hendee, The demand survey dilemma: Assessing the credibility of State outdoor recreation plans, *in Guideline*, Vol. 2, No. 6, Nov./Dec. 1972.

[8] The SCORP guidelines suggest consideration of other items in addition to past use trends.

[9] Cf. Charles Cicchetti, Forecasting recreation in the United States, Lexington Books, Toronto, 1973.

by the States at present, although many officials recognize the need to move toward these approaches, if for no other reason than to increase the credibility of the results of their analyses. Finally, surprisingly few States mentioned that they explicitly considered expected trends in out-of-State use.

Quantification of Recreation Benefits

An almost unanimous reply from the States was that they do not attempt to quantify recreation benefits, although they wished there were some practical way for doing so. A few States are developing approaches to recreation value estimates, but most of these do not have high hopes for any sudden revelation of a universally-accepted system.[10]

Whether it be good or bad, until acceptable dollar measures of recreation values can be established, it will be difficult to apply any of the economic evaluation approaches discussed earlier other than the cost-effectiveness measure, which, as mentioned, has serious limitations in terms of comparing projects with different characteristics.

Criteria for Project Selection [11]

Out of the wealth of material sent to us by the States, the criteria in table 1 were identified. While four main categories have been singled out, there is considerable overlap between them.

Criteria related to the resources.—A priority concern of many States is acquisition of new lands, regardless of expected immediate use. The argument made is that lands be acquired now or they will not be available in their present natural state in the future. The types of criteria used to judge acquisitions include irreversibility, regional land scarcity, uniqueness of an area, and "environmental protection". Many States use committees or some form of interdisciplinary planning team to judge on the basis of experience whether a proposed area meets any or all of the above criteria. Few States have developed any kind of quantitative criteria for judging uniqueness, irreversibility, etc., although some have set up ranking systems where numbers are assigned to various characteristics of an area. The sum of the numbers assigned provides an indication of the importance of the area.[12]

Criteria related to meeting supply deficit.—Since the BOR/SCORP guidelines emphasize the need to meet supply deficits that can be expected over the planning period (15 to 30 years), many States guide their acquisition and development programs by a set of criteria relating to this concept. A proposed recreation project is thus judged in terms of its contribution to overcoming a forecasted supply deficit. In some cases, cost-effectiveness criteria are used as guides to allocating a limited budget. Other criteria relate to the actual or potential availability of private or other governmental supply alternatives. Some States consider only resident use forecasts in determining supply deficits, while a few also consider expected future out-of-State use. Some of the evaluation procedures consider regional supply deficits within States and allocate funds to those areas with the greatest deficits.[13] Population area served and nearness to urban concentrations of population are also considered as criteria by some States. Supplying a "deficit" is a very popular approach among the States.

Institutional criteria.—As mentioned, many States use the committee approach to determining the merits of alternative recreation developments for meeting their SCORP projections of supply deficits. The criteria which these committees use in evaluating projects were generally not specified. Very likely, the States in these cases relied upon the quality and experience of the persons making up the committee. Other States indicated that their choice of alternatives was guided by criteria related to "departmental responsibilities," or by

[10] Several interesting studies dealing with this subject have come out recently, including: A method for establishing outdoor recreation project priorities in Alaska, by George K. White and Wayne C. Thomas, University of Alaska, Institute of Agricultural Sciences Research Bulletin 40, Aug., 1973; and Kenneth C. Gibbs and John McGuire, III, Estimation of outdoor recreation values, University of Florida, Food and Resource Economics Department, July, 1973.

[11] The report mentioned in footnote 1, page 1, will include reference to specific States and more details on approaches.

[12] See Appendix I.

[13] The BOR guidelines recommend regionalization of States for the purpose of planning.

TABLE 1.—*Recreation project evaluation criteria*

Resource oriented [1]	Related to supply deficits [2]	Institutional criteria [3]	Other criteria [4]
Irreversibility.	Nearness to population.	Committee criteria.	Employment creation.
Land scarcity.	Other similar facilities.	Departmental responsibility and philosophy.	Fire protection.
Uniqueness.	Other nonresident use.	Public acceptance.	Incremental development possibilities.
Environmental consideration.	Population area served.	Political acceptance.	
Development potentials.	Use/cost relationships.		

[1] Main impetus: Acquire new lands.
[2] Main impetus: Meet BOR/SCORP Guidelines related to supply deficits.
[3] Main impetus: Gain political acceptance in State.
[4] Main impetus: Relate to special problems and concerns in State.

the "philosophy of the department" in question. Again, no operational criteria were mentioned. A number of States view public evaluation and acceptance of a proposed project as a most important element in the evaluation process. If there is significant public resistance, then the project is dropped from further consideration ("since it would probably not be workable in any case").

Finally, the question of jurisdiction came up in several of the responses. If forecasted use of a proposed area is primarily local, then the responsibility for development (not necessarily financing) is put on the shoulders of the county or local government unit. But several States indicated that if local funds were to accompany State funds, then the project was given a higher priority. On the other hand, if national significance is involved, the Federal government is often requested to step in to acquire or develop an area. Sometimes disagreements arise regarding the level of significance of an area—e.g., a local government unit may argue that the area has wider significance and therefore should be developed by the State or Federal governments, while the higher levels of government may argue just the opposite. Some States are developing criteria for use in solving this problem.

Other criteria.—Finally, a number of States put forth criteria which do not fall in any of the above classes. For example, Puerto Rico uses employment creation as a consideration in evaluating recreation projects. Oregon stated that it considered the impact of a new area on fire protection of surrounding lands. Several States said that they considered it to be important that a project could be developed in stages, with each successive stage being added as estimated demand was realized.[14]

Discussion

The response of the States to our questions generally showed a great deal of variability. However, several common points stand out clearly:

1. The BOR guidelines for State qualification for LAWCON funds have had a great influence on the planning activities of the States. However, within the general format for the SCORP planning exercise, there is also a great deal of variation in the way in which State agencies have developed methodology, ranking systems, and approaches for generating information included in their State programs and plans. Further, some of the specific BOR/LAWCON policy guides for establishing priorities [15] were not emphasized by the States as criteria for project selection and setting priorities.

2. Almost none of the States have attempted to quantify recreation benefits, and those that have are very skeptical of the results.

[14] This "incremental" approach is essentially used in lieu of criteria for evaluating the demand-supply relationships involved for a project, i.e., if we are uncertain about our demand forecasts, it makes some sense to proceed in stages, starting with a small project and building up as capacity is reached.

[15] Section 600.3.6.10 of the *BOR Recreation Manual* states that, Generally, in the submission of acquisition and development proposals for assistance, priority should be given to meeting urban needs, to activities of the general public over those for a limited group, to basic over elaborate facilities, to active over spectator-type facilities, to projects not having other public or private funds available to them, and, where a scarcity of recreation lands exists, to acquisition over development. Projects which would enhance, preserve or restore natural beauty are encouraged.

3. Few States have developed quantitative measures for their project justification or evaluation criteria, and most of those that have done so have developed simple ranking systems for identifying priorities.[16] The greatest amount of work has been devoted to, and the greatest success has been achieved in, developing criteria for site analysis and evaluation.

4. Few of the States appear to consider economic criteria explicitly in their evaluation systems or in their priority rankings. And few States mentioned evaluation criteria related to economic impact of proposed projects. The extent to which such impact analyses actually play a significant part in the decision regarding a specific proposal is difficult to say.

5. Some States use cost-effectiveness measures. The criterion is generally stated as follows: Other things being equal, the alternative with lowest cost per use-unit is chosen for meeting a specific recreation objective. While this makes intuitive sense, the difficulty of determining "other things being equal" generally reduces the usefulness of a cost-effectiveness approach.

Implications

We did not anticipate the magnitude of response to our survey that we did get. Consequently, time did not permit carrying out a detailed analysis of the complete responses provided by the States and their implications. This is something which we fully intend to accomplish in the next few months. However, at this point in time, a few clear implications stand out.

The basic problem in applying economic criteria is that of valuing nonmarket goods and services and "intangibles".

How should this question of estimating outdoor recreation values be approached? It is not our intention here to get into the technical details of valuation methodologies. However, a few comments are in order. First, there have been a number of studies that have treated the subject and that have made progress in developing defensible approaches.[17] Second, we can learn something from the literature on analysis and evaluation of economic development projects, particularly those related to developing countries where market prices are generally considered to be less indicative of social values. Development economists have generated quite a volume of theoretical and applied literature on this subject. There is a need for economists and planners interested in recreation to make appropriate adaptations.

Until we do develop acceptable measures of recreation values in economic terms, it makes little sense to try to force the use of benefit-cost analysis and other forms of economic analysis in recreation evaluations. While this type of effort may produce some desirable political results—as long as we are not challenged on underlying premises and assumptions—it will not in the long run produce the results which we are presumably aiming for in our recreation planning efforts. If we do insist on applying the benefit-cost approach, it is essential that our analysis put strong emphasis on the sensitivity of results to alternative value assumptions. In other words, sensitivity analysis provides the decisionmaker with a perspective on how sensitive a particular result (or option) is to changes in assumed recreation values, estimates of potential use, etc. He thus has a better idea of how critical a particular assumption is and can concentrate his deliberations on the extent to which he accepts or does not accept the critical ones.[18]

[16] See Appendix for some examples.

[17] Cf. footnote 9 of this paper, and Wm. E. Martin et al, The demand for and value of hunting, fishing and general rural outdoor recreation in Arizona, Technical Bulletin 211, University of Arizona, Agricultural Experiment Station, June 1974; G. H. Manning, Subjective evaluation of recreation sites, Information Report E-X-20, Environment Canada, Forest Economics Research Institute, April 1973; (Also references cited in these studies).

[18] Sensitivity analysis or consideration of alternatives is emphasized in the recent Water Resources Council, Water and related land resources: establishment of principles and standards for planning. These are printed in the Federal Register, Vol. 38, No. 174, Part III, Sept. 10, 1973.

What do we do in the meantime? Several preliminary suggestions based on our survey and the academic literature can be put forth here. First, we have to approach the recreation valuation problem in stages. This is indeed what many of the States are doing at present. A first step is to develop ranking systems (such as indicated in the examples shown in the appendix). Second, the opportunity cost approach, which involves estimating values given up by developing a particular recreation project, can be employed.[19] While this only gives a minimum value for decisionmakers to consider in making decisions regarding a project, it does provide us with an initial step, as long as its meaning is fully understood. Third, the use of economic impact studies for prospective recreation projects should be expanded.[20] After all, *one* of our interests in developing recreation projects is to contribute to general well-being, and this means developing the economic health of communities in addition to providing increased opportunities for citizens to participate in recreation activities. We have to consider the non-recreational impacts of projects. Indeed, this is the idea behind environmental impact analyses. Almost all projects—whether they relate to recreation or not—have effects which reach beyond the narrow limits of the projects themselves and their direct beneficiaries. Some of these external effects are positive and some are negative. Whether on balance the external effects of a project are positive or negative can only be determined through analysis. One might hope that recreation projects have net positive effects, but only objective analysis will tell. A promising tool for getting at the interaction of a given project with the rest of the economy is input-output analysis.[21]

We could go on and on reviewing suggestions for approaches to recreation project evaluation. A great deal of solid work has been done in this area. However, it seems all too apparent to this writer that the link between the verbal outflow of ideas and academic approaches and the application of such ideas and approaches is one of the critical bottlenecks. The present workshop—and others to come—will hopefully make some of these links a little more clear and point the way to an incremental application of the economic approaches developed by the non-practitioners and researchers.

Appendix

New York Statewide Comprehensive Outdoor Recreation Plan

Priority System

New York's Statewide Comprehensive Outdoor Recreation Planning process has developed the forecasts, statewide plans, goals and objectives which indicate future recreation and open space needs. These needs must be met with the limited funds available for this purpose and in prompt response to opportunities available to the State and to local government.

In order to establish an evaluation system which will help to provide the necessary linkages to needs, plans, goals and objectives, a priority evaluation system was developed and tested during the 1971–72 fiscal year. This system was adjusted in 1972–73 fiscal year to reflect current SCORP, *People-Resources-Recreation*, findings and to allow the continuation of this flexible tool which relates multifaceted individual projects to a variety of broader statewide plans and objectives.

The criteria used to develop the New York State outdoor recreational priority system is, like any empirical effort, based upon both available

[19] This is parallel to the "cost-price" approach, which attempts to determine a minimum value per use-unit, based on the cost of providing the particular use. This is the minimum value which has to be justified.

[20] Cf. An Economic Impact Study of Mt. Rainier and Olympic National Parks, prepared for the National Park Service by Wm. B. Beyers, Dept. of Geography, University of Washington, February 1970, and Robert J. Griffis, Projected Tax Revenues Accruing to James City County as a Result of the Development of York River State Park, Division of State Planning and Community Affairs, Richmond, Va., October 1971.

[21] Cf. Sheryl E. Ferguson and Clynn Phillips, The Use of I/O Models in Evaluating the Impact of a Potential National Park. Mimeographed paper prepared for the National Park Service, (no date), and Jay M. Hughes, Forestry in Itaca County's economy—an input-output analysis, Agricultural Experiment Station, University of Minnesota, Misc. Report 95, Forestry Series 4, 1970. (See also references in Hughes study.)

data and certain value judgments or assumptions. These assumptions listed on the revised priority form and backup material have been judged through a year's work to represent the varied factors involved with recreation projects proposed for State and/or Federal aid. It is recognized, however, that some unique and major projects will require full analysis of a sector of this evaluation or of all areas of concern to determine the relationship of the proposal to statewide and/or regional plans.

As determined during the year's test period, a project priority rating of approximately five or greater represents the current cutoff point which warrants project implementation. Higher ratings can be used to compare the relative importance of the projects in implementing of plans relating to accepted priorities.

A copy of the priority system evaluation sheet is included on the last sheet of the pamphlet following instructions on its completion.

Instructions for Completion of Priority System Evaluation Sheet

A. *Physical and Recreational Factors*

Factors relating the proposal to recreational and open space needs, plans and goals:

1. Statewide and Local Open Space and Recreation Plans

   Proposals contributing directly to the implementation of projects and policies as defined in the Statewide Development Plan, SCORP, Interstate (Provincial), National, regional or local plans receive plus one; all others zero.

   Also included in this section is a space for a specific SCORP, *People-Resources-Recreation*, page reference.

2. Index of Relative Intensity of Need

   The index of relative intensity of need is a measure of the amount of use the proposal will receive per dollar. Two factors: (1) Relative activity effectiveness factor and (2) 1990 forecast use/capacity ratio are multiplied; their product divided by 100 and rounded to the nearest whole number is the index of relative intensity.

   Table 1 has the relative activity effectiveness factor for each of ten major outdoor recreation activities and SCORP references indicating the page on which the forecast use/capacity ratios are shown for each of the major activities.

   When calculating the index of relative intensity of need, forecast use/capacity ratios less than 80 percent should be treated as zero.

   Example (1): Day-use project in Albany County

80	×	2. 4/100=1. 92
Forecast use/capacity ratio from p. 86, SCORP		Relative activity effectiveness factor from Table 1

   2
   Index of relative intensity of need (rounded to nearest whole number)

   Example (2): Fishing access project in Nassau County

140	×	3. 6/100=5. 04
Forecast use/capacity ratio from p. 100, SCORP		Relative activity effectiveness factor from Table 1

   5
   Index of relative intensity of need (rounded to nearest whole number)

   If the proposal has several diverse activity components, the index of relative intensity of need should be computed by averaging the indices of each of the components.

3. Length of season

   If the project substantially extends the system's operational season, a SCORP goal, it should receive a +1 evaluation and if the project will only reinforce peak use period at the recreational area, it should be rated negatively under this criterion.

4. Safety

   If the project improves the safe operation of existing site, a SCORP goal, or if it includes special provision for safety, it should be rated positively under this criterion.

   Examples would be lighting urban parks or fencing hazardous areas.

5. Adds to capacity and/or unique service provided

   Projects *substantially* adding capacity and/or projects adding a unique dimension to statewide or regional recreation system (e.g., the State's only bobsled run) have plus one added.

B. *Social and economic factors*

Factors relating the proposal to social and economic objectives:

1. Variety of population to be reached

If the project is designed to serve a broad spectrum of the population, an indicator of needs identified in SCORP, then the project should be rated favorably under this criterion. In the consideration of this criterion, the limited recreation options available to the economically underprivileged, and of special age group, such as teenaged girls and the elderly, should be considered.

2. Consistent with existing public and private facilities

As noted in SCORP, the private sector plays a dominant role in the provision of outdoor recreation facilities throughout the State. Private enterprenuers will continue to develop marketable recreation facilities where market demand is sufficient to allow profitable operations; concentrating on those activities which individuals value most.

Public investment should not be made if a project will upset the existing patterns of private recreation enterprise. In areas which the private sector provides service rarely does public subsidy decrease cost sufficently to allow additional recreators into the market.

Any project which will compete with existing facilities or will tend to inhibit expansion of private recreation supply receives minus two on this factor.

3. Local economic impact

A project receives one point if it will substantially benefit the local economy (i.e., create jobs in economically depressed areas not merely increase the value of contiguous properties).

4. Time specificity of project

Proposals which will make usable projects which are currently partially complete or acquisition of land in rapidly developing areas receive plus one point for their time specificity.

C. *Environmental contribution*

Projects which protect and/or enhance ecological, open space and historic resources which are identified in SCORP, the statewide Development Plan, regional plans and other recognized plans should be rated plus two under this criterion.

Projects which help the population to relate to the ecological processes should receive a plus one rating.

Projects which account for no major contribution or detriment to the environment should be rated zero.

Proposals which will have minor negative impact caused by the project and/or anticipated uses of the project area should be rated minus one for this criterion.

Projects which have a noted adverse impact, as determined through required environmental impact analysis should be rated minus two under this criterion.

TABLE 1.—*Effectiveness of development expenditures*

Activity	Facility type	Approximate number people served per year per $100 construction cost	Relative activity effectiveness factor (base 5 people per $100 per year)	SCORP reference forecast use/capacity ratio (see page number) people, resources, recreation
Day use	Swimming/picnicking/etc	12	2. 4	86
Camping	Developed campsites	8	1. 6	88
Boating	Marina	5	1. 0	90
	Boat Launching	13	2. 6	
Neighborhood	Playfields	20	4. 0	92
	Totlot/passive	22	4. 4	
Local winter	Ice skating rink	11	2. 2	94
	Winter use area	19	3. 8	
Golf	18 holes/std	5	1. 0	96
Skiing	Slopes/trails and lift	10	2. 0	98
Fishing	Fishing access area	18	3. 6	100
Hunting	Managed hunting area	8	1. 6	102
Trailways	10 Mi.+/Year-round use	12	2. 4	86

New York SCORP Priority System

Park Name____________________________

County______________ Town or Village______________

Land Acquisition Cost____________________

Acres Acquired________________________

Construction Cost______________________

Total Proposal Cost_____________________

Day-Use Capacity_______________________

Outdoor Living Capacity__________________

Other Capacity (Specify)__________________

A. *Physical and Recreational Factors*

1. Statewide and Local Open Space and Recreation Plans
   - +1 Contributions to implementation of plans
   - 0 Of only marginal contribution

   SCORP Ref. p. ________
2. Index of Relative Intensity of Need

   1990 forecast use/capacity ratio for major project activity (from SCORP: see Table 1 for reference) ________

   (Round to nearest whole number) Relative activity effectiveness factor (from Table 1) ______
3. Length of Season
   - +1 Extends system's operational season
   - 0 Does not extend system's operational season
   - −1 Only reinforces peak use periods ______
4. Safety
   - +1 Makes the site safer
   - 0 Does not substantially affect safety
   - −1 Creates a potentially hazardous condition ______
5. Adds to Capacity and/or Unique service provided
   - +1 Substantially increases capacity of system and/or provides unique service
   - 0 No substantial added service ______

B. *Social and Economic Factors*

1. Variety of Population to be Reached
   - +1 A wide spectrum (age, income, race) of population reached
   - 0 Benefits confined to a limited group ______
2. Consistent With Existing Public and Private Facilities
   - 0 No conflict
   - −2 Will compete with existing facilities or will tend to inhibit expansion of private supply to meet recreation demand ______
3. Local Economic Impact
   - +1 Will be of substantial importance to local economy
   - 0 Only of marginal value to local economy ______
4. Time Specificity of Project
   - +1 Needs to be done now or new stage of ongoing
   - 0 Project can be postponed ______

C. *Environmental Contribution*

- +2 Protects or improves needed ecological resource
- +1 Enables clearer perception of ecological processes
- 0 Causes little enhancement
- −1 May cause some environmental problems
- −2 Conflict with ecological, historic and/or environment ______

Total ______

Prepared by_____Title_____Date_____

ATTACHMENT X, LAND AND WATER CONSERVATION FUND

Utah Outdoor Recreation Agency Priority System for Rating L&WCF Project Proposals 1974 (Fiscal 1975)

The Values in this system are determined by some undelineated considerations which have been attached according to current needs and priorities. A brief explanation follows:

In the left hand margin of the priority system, which we have enclosed, is a column labeled "Points". The numbers in brackets are multipliers; their use will be discussed later. The numbers in parenthesis are sub-multipliers which establish a priority position for each Consideration (such as fiscal administration or application capacity) within the Criteria Category (administrative considerations). Those numbers which are listed in columns or sets correspond to the Rating Situation on the same line. With these things in mind, the system can be explained.

An initial weight (upper limit) is assigned to each Criteria Category. Originally, Category I was set up as the high base (100 percent) and each of the following categories was a percentage of that base, i.e., Categories II and III were to equal 90 percent of Category I; Category IV, 80 percent of Category I, and so forth. As the system has been

refined, the ratios have been changed somewhat, but the weighting still reflects their importance in relation to the other criteria—thus Category II equals 280 points, possible, whereas Category VI equals 200.

Each Consideration within a Criteria Category has a ranking of Situations with corresponding points (anywhere from 0 to 5) in the left hand margin. Where the Considerations within the Criteria Category are not equal in importance, a sub-multiplier is attached to each Consideration. Multipliers are used to bring the total for the top scores (addition of the Ranking Situation multiplied by the sub-multipliers for each Consideration) to a total equal to the initial weight assigned to that Criteria Category. The multiplier × the ranking × the sub-multiplier (if any) = the corresponding number in the Value column. By adding the top-ranking Situation for each Consideration within the Criteria Category one will come up with the total possible points for that Category. (This does not hold for Category I.)

The following examples should make the process clear:

Project X is a riverside acquisition project in a small urban area where, if the city does not purchase the land, it will come under private development.

Project X:

Criteria			Total Points and Possible
I	A	5×[60]=300	300 of 330 possible
II	A	5×[20]=100	
	B	4×[20]= 80	280 of 280 possible
	C	5×[20]=100	
III	A	5×(5)×[4]=100	
	B	5×(5)×[4]=100	248 of 280 possible
	C	3×(4)×[4]= 48	
IV	A	5×(3)×[11]=165	275 of 275 possible
	B	5×(2)×[11]=110	

Utah Outdoor Recreation Agency Priority System for Rating L&WCF Project Proposals 1974 (Fiscal 1975)

Points	Criteria	Value	Point range
[60]	I. *Magnitude of Loss:*		60 to 330.
	A. *Acquisition Projects:*		
5	1. High Importance and Critical Timing	300	
3	2. Important and Timely	180	
1	3. An Acquisition Project	60	
	OR		
	B. *Development Projects:*		
3	1. High Importance and Critical Timing	180	
2	2. Important and Timely	120	
1	3. A Development Project	60	
	OR		
	C. *Acquisition and Development Project:*		
5.5	1. High Importance and Critical Timing	330	
3.5	2. Important and Timely	210	
1.5	3. A Combination Project	90	
[20]	II. *Administrative Considerations* (participant):		40 to 280.
5 4 3 2 1	A. *Fiscal Administration:* The ability to maintain adequate financial records, provide adequate accounting personnel, utilization of a system to determine overall efficiency of acquisition and/or development programs for recreation.		
	1	100	
	2	80	
	3	60	
	4	40	
	5	20	

	Criteria	Value	Point range
	B. *Application Capacity:* Providing detail cost, master plan, and has certified that the money is available.		
4	1	80	
3	2	60	
2	3	40	
1	4	20	
	C. *Utilization of Funds:*		
5	1. New Applicant	100	
5	2. A history of good turnover of funds	100	
3	3. Not so good a record	60	
0	4. Holds funds until project costs rise	0	
[4]	III. *Meeting Identified Outdoor Recreation Needs:*		36 to 280.
	A. *Project Relative to District's Priority Of Needed Facilities:*		
5	1. A high priority facility for District and sponsoring entity	100	
4	2. A high priority facility for District but not for sponsoring entity	80	
3	3. A medium priority facility for District and sponsoring entity	60	
1	4. A medium or low priority facility for District but not for sponsoring entity.	20	
(5)	B. *Project Relative to Local Needs:*		
5	1. No such facility or opportunity within area	100	
3	2. Present facilities inadequate	60	
1	3. Facilities adequate but addition would enhance program	20	
0	4. Other facilities in the area are capable of handling use	0	
(4)	C. *Project Relative to Overall Statewide Priority of Needed Facilities* (USU Study):		
5	1. Swimming Pools, Bicycle Paths, Camp Facilities, Tennis Courts	80	
3	2. Gold Courses, City Parks, Picnic Areas, Skiing-Winter Play Areas, Playgrounds.	48	
2	3. Ice Rinks, Motorcycle Trails, Bridle Paths, Boating Areas, Hiking Trails.	32	
1	4. Other	16	
[11]	IV. *Site Location* (in relation to area served)		55 to 275.
(3)	A. *Distance from Main User Groups:*		

	Local	*Regional*	*Statewide*	Value
5	.00 to .25 hr	.00 to .50 hr	.00 to 1.50 hr	165
4	.25 to .50 hr	.50 to 1.00 hr	1.50 to 2.50 hr	132
3	.50 to 1.00 hr	1.00 to 1.50 hr	2.50 to 3.50 hr	99
2	1.00 to 2.50 hr	1.50 to 2.50 hr	3.50 to 4.50 hr	66
1	2.50 to 5.00 hr	2.50 to greater	4.50 to greater	33

	Criteria	Value	Point range
(2)	B. *Adequacy of Access to Sites:*		
5	1. Excellent	110	
4	2. Very Good	88	
3	3. Good	66	
2	4. Fair	44	
1	5. Poor	22	
[5]	V. *Socioeconomic Factors:*		50 to 250.
(5)	A. *Cross-Section of Public Served:*		
5	1. All age, sex, socioeconomic groups	125	
(3)	2. Some age, sex, socioeconomic groups	75	
1	3. Few age, sex, socioeconomic groups	25	
(3)	B. *Population Served, Considering Influence Area:*		

	Local	*Regional*	*Statewide Plus*	Value
5	6000+	120,000+	4,000,000+	75
4	3500 to 6000	50,000 to 120,000	2,000,000 to 4,000,000	60
3	1200 to 3500	20,000 to 50,000	1,000,000 to 2,000,000	45
2	700 to 1200	10,000 to 20,000	700,000 to 1,000,000	30
1	0 to 700	up to 10,000	up to 700,000	15

Utah Outdoor Recreation Agency Priority System for Rating L&WCF Project Proposals 1974 (Fiscal 1975)—Continued

	Criteria	Value	Point range
(2)	C. *Nonresident Vacation Use and Economic Benefits From Utah Population Centers:*		
5	1. Major Attraction	50	
4	2. Substantial Attraction	40	
3	3. Medium Attraction	30	
1	4. Minor Attraction	10	
[2]	VI. *Planning, Design, Program:*		10 to 200
(5)	A. *Range of Activities Available:*		
5	1. 7 or more activities	50	
4	2. 5 or 6 activities	40	
3	3. 3 or 4 activities	30	
2	4. 2 activities	20	
1	5. only one activity	10	
(5)	B. *Enhancement of Activities* (greater use through education, interpretation or recreation programs or facility sharing):		
5	1. Excellent Program	50	
4	2. Very Good Program	40	
3	3. Good Program	30	
2	4. Fair Program	20	
1	5. Poor Program	10	
0	6. No Program	0	
(5)	C. *Unusual, Unique, or Experimental Activity, Design, or Use of Site:*		
5	1. Highly Creative	50	
4	2. Creative	40	
3	3. Innovative	30	
2	4. Tried Something	20	
0	5. Not Creative	0	
(5)	D. *Seasonal Activities:*		
5	1. Year-round opportunity	50	
4	2. Long Season	40	
3	3. Normal Season	30	
2	4. Somewhat Limited Season	20	
0	5. Very Limited Season	0	
	Total Point range		251 to 1615.

THE USE OF GRAVITY-POTENTIAL MODELS FOR OUTDOOR RECREATION BENEFIT ESTIMATION

William E. King [1]

Introduction

Pressure is continually increasing to have public outdoor recreation decisionmakers justify items in their budgets, especially capital improvements, on the basis of so-called "objective measures". Cost-benefit analysis is the usual objective measure employed by public agencies. Economists are in general agreement that the area under a demand curve drawn on price-quantity axes is the best available estimate of the benefits accruing to society from the free provision of a good or service. Problems of two types arise when public outdoor recreation decisionmakers try to apply this knowledge. First, there is the problem of accurately estimating the demand curve for the often unpriced outdoor recreation service in question. Second is the problem of correctly utilizing the demand curve in the benefit estimation process.

The objectives of this paper are to advocate a particular approach to the use of gravity-potential analysis for outdoor recreation demand estimation, and to describe the way in which demand curves derived from gravity-potential models can be used to estimate the benefits from certain types of public expenditures for outdoor recreation.

Estimating Outdoor Recreation Demand Curves Using Gravity-Potential Analysis

Gravity or spatial interaction models are usually used to predict the amount of travel from a particular origin to a particular destination. They are also used to estimate the amount of economic activity at the destination which can be attributed to people from the origin. Information used as input to gravity models consists of the distance between the origin and destination, the origin population, and destination location characteristics. As an example, we might statistically analyze the visits from each county in Virginia to each facility in the Virginia State Park System. The populations of the counties, the distances from the counties to each park, and the characteristics of the parks would be used as variables in the analysis. The results of the analysis could be used to predict the visits to be expected at a proposed park in Louisa County from the Richmond area on the basis of the new park's location and its characteristics.

Potential models are used to predict the total visits or the total economic activity at the destination from all origins. Input to potential models consists of much the same information as gravity models except that the values are gathered from a set of origin locations which are expected to provide most visits to the destination. As an example, we might statistically analyze the man-days spent at each facility in the Virginia State Park system by people from all counties in the State. Similar variables as in our gravity model would be employed except that the model used to analyze the relationships would have a different form. The results of the potential analysis could be used to predict total man-days at the proposed Louisa County Park from all counties in the State on the basis of the park's location and facilities.

There is a serious fault with the approach just described. It lacks a basis in theory. The results of the statistical analysis are systematic empiricism which we have little reason to believe will work in other situations. We might also question the realistic predictive power of such an approach.

Fortunately, there is an alternative approach available. For ease of discussion, I shall label this alternative, "the deductive approach". The deductive approach consists of positing a constrained utility function defined on the characteristics of destination locations. Then a gravity- or potential-like equation estimating the number of trips to the destination location can be derived. The equation will probably contain the same variables as the empirically derived gravity or potential model, but

[1] Assistant Professor of Forest Economics, Department of Forestry and Forest Products, Virginia Polytechnic Institute and State University, Blacksburg, Va.

its functional form will have a basis in social science theory.

I have recently completed a study of the spatial distribution of Michigan deer hunters which utilized the deductive approach. A Cobb-Douglas utility function was posited for the typical deer hunter. The model derived from this utility function turned out to be linear in form. For the purposes of the study, a potential model using each county of the State as an observation seemed most appropriate. The resulting potential model was then tested using an ordinary least squares linear regression procedure. A model with independent variables consisting of a nearness index for the destination county (this index includes population and distance variables), the area of the county, and the harvest per square mile in the county during the previous season explained better than 90 percent of the variation in man-days spent deer hunting in Michigan counties during the period 1961–1969.

The most important feature of the deductive approach is that it is based on the simple, appealing assumptions about human behavior found in utility theory. Another important feature is that it still gives good empirical results. The fact that it is grounded in some generalizations about human behavior constitutes a compelling reason for believing the approach will work in other situations. Models based only on empirical work can make no such claim.

Using Demand Curves Derived From Gravity-Potential Models For Outdoor Recreation Benefit Estimation

Having briefly discussed the derivation of gravity-potential models from utility theory, our next step will be the description of the use of the results of such models for outdoor recreation benefit estimation. Outdoor recreation output is usually measured in terms of man-days of use. Since gravity-potential models can be solved for this variable, we have a ready-made measure for the quantity axis of our usual demand-supply graph. Multiplying distance travelled by a cost per mile yields a cost which may be interpreted as a minimum estimate of price in a demand function. The coefficient and functional form of the relationship between man-days and price define the slope and functional form of this demand relationship. The foregoing is familiar from the work of Clawson and many others. The point being made here is that most gravity-potential models, including the type used in the Michigan deer study, contain variables which make them demand equations. Independent variables other than distance in these equations may be thought of as demand curve shifters. As an example, in the Michigan deer study, changes in hunter populations or in the size of the deer herd could be expected to change the number of man-days spent hunting deer by shifting the demand curve for this activity. Changes can also occur in the underlying socioeconomic factors which determine the magnitude of the parameters of the model. The impact of these types of changes could be investigated using time-series analysis if it were thought necessary to do so.

Demand curves derived from gravity-potential models can be used to estimate benefits of both programs and projects. In each case, the aror under the demand curve without the program ea project should be calculated. For a study of the impact of a program, this would mean using date for the whole region under study, say a State, as input to the model equation. For a project evaluation, the values of the variables used in the calculations would be those which apply to the prioect area only. The next step is to estimate the change in the crucial variables caused by the program or project. For instance, the impact of a deer habitat improvement program on the yearly harvest of deer per unit of area in Michigan, or the change in a Virginia State park's waterfront area occasioned by the construction of a new beach within the park would have to be estimated. The model including the change in the variables could then be solved for the area under the demand curve. The difference in the area under the demand curve with and without the program or project would be an estimate of the yearly dollar benefits of the program or project. The yearly benefits would then be discounted to arrive at an estimate of benefits for the life of the program or project.

The degree of sophistication with which this process is carried out will depend on the problem and the resources available for its solution. Where greatest accuracy is desired, studies projecting each of the variables in the model may be undertaken.

Advantages and Disadvantages of The Use of Gravity-Potential Analysis For Outdoor Recreation Benefit Estimation

The advantages of the use of gravity-potential analysis for outdoor recreation benefit estimation include the fact that accuracy of estimates can be expected to equal or exceed the accuracy of any other method currently available. The data necessary for these models (estimates of use, user populations, distances between population centers and facilities, and variables thought to act as curve shifters) are usually readily available. Once an agency is set up for the analysis, costs of such benefit estimation can be expected to be quite low. Finally, the method is flexible. Managers can expect that fairly good proxies for the impacts of almost any program or project can be constructed.

There are several disadvantages of using this method of benefit estimation. In order for the regression analysis upon which the models are built to be accurate, a large number of individuals must be polled concerning their outdoor recreation travel patterns. Also, until an agency is properly set up for this type of study, highly trained advisory personnel are needed. Only the largest agencies can be expected to be able to afford to employ such personnel, although consultants can be hired to perform these advisory functions.

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RECREATIONAL USER BENEFITS FROM WATER QUALITY IMPROVEMENT

Richard G. Walsh [1]

Economic theory and consumer behavior suggest that there are at least three distinct types of recreational user benefits from investment in water quality improvement programs. First, and foremost, is a potential *reduction in price* (travel time and cost) to current users, primarily fishermen, boaters, and swimmers. Second, the lower price stimulates an *expansion* in these water-based recreation activities, both on the part of existing users and new. Third, some existing users may benefit from a *shift in the quality* of their recreation experience, although much less is known about its dollar magnitude.

The recreational user benefits from water quality improvement developed in this paper are based on three types of information: the amount of polluted waterways to be cleaned up; the relationship between changes in the recreation behavior of consumers and changes in water quality; and the price or willingness to pay for water-based outdoor recreation activities.

The benefit estimation procedure is based on the following assumptions: First, the 29 percent of the Nation's waterways which are now polluted and unsuited for water-based recreation activities are to be restored, thus adding approximately 40 percent to the available supply of waterways for recreation activities. Second, while evidence is not fully developed, there is reason to believe that water pollution is not distributed randomly across the geography of the Nation, but is closely related to the distribution of people, higher in urban and lower in rural areas. Further investigation is likely to find that pollution is disproportionately higher in some urban areas. However, for purposes of this study, it is assumed that existing water pollution is distributed the same as people over the landscape. It is indicative that only 19 percent of the persons who live in standard metropolitan areas fished in 1970 compared to 26 percent nonfarm outside standard metropolitan areas and 24 percent farm, according to the National Survey of Fishing and Hunting (*14*, p. 39). Third, the newly restored waterways will substitute for existing water-based recreation sites. The favorable location of newly restored waterways, on the average, results in a substantial saving in the travel and time price of fishing, boating, and swimming. Fourth, the relationship between travel distance and pollution is very nearly one-to-one. A 1.0 percent change in water pollution is expected to result in a 1.0–1.2 percent change in travel for water-based recreation (*13*). While this seems to hold true for all levels of water pollution, recreation water users are willing to travel somewhat farther to avoid the mid-range of pollution.

Polluted Waterways

The amount of water pollution has been estimated for the nine major river basins of the United States. The annual report of the Council of Environmental Quality (*9*, p. 12) showed that approximately 27 percent of all U.S. stream and shoreline miles were polluted in 1970. This increased with improved field reporting to 29 percent in 1971. For purposes of this analysis, the proportion of stream and shoreline miles defined as polluted is assumed to be 29 percent (table 1). Therefore, it is possible to increase by approximately 40 percent (29÷71) the miles of waterways suitable for water-based recreation. This is, however, a tentative approximation, and not a firm number.

The level of water pollution is a very complex question. For in reality, pollution is always a matter of degree, rather than *yes* or *no*, and is closely related to use. The estimate used here was derived from an Environmental Protection

[1] Professor, Department of Economics, Colorado State University, Fort Collins, Colo. (This paper was prepared under an Intergovernmental Personnel Exchange Act contract with the Environmental Protection Agency, Washington, D.C. The assistance of Dr. Fred Abel and Dr. Dennis Tihansky is gratefully acknowledged.)

Agency study. It is based on Federal-State water quality standards, which vary from place to place, depending on the local use of water, for drinking, swimming, fishing, industrial waste discharge, and other uses. It is corrected for natural pollution levels. Table 1 presents a simple percentage calculation of pollution levels. In the EPA study, this was supplemented using a prevalance-duration-intensity index (PDI) showing the degree of pollution and how long during the year the waterway was in violation of the standards. The number of polluted stream miles was multiplied by the duration-intensity factor. Thus, the higher the factor, the worse the pollution.

TABLE 1.—*Estimated stream and shoreline pollution in major river basins, United States, 1971*

Major river basin	Total stream and shoreline	Polluted stream and shoreline	Proportion polluted
	miles	*miles*	*(percent)*
Ohio	28, 992	24, 031	83
Southeast	11, 726	4, 490	38
Great Lakes	21, 374	8, 771	41
Northeast	32, 431	5, 823	18
Middle Atlantic	31, 914	5, 627	18
California	28, 277	8, 429	30
Gulf	64, 719	11, 604	18
Missouri	10, 448	1, 839	18
Columbia	30, 443	5, 685	19
United States	260, 324	76, 299	29

Source: Environmental Protection Agency, The Cost of Clean Water, 1972.

Table 1 shows that nearly all of the waterways in the Ohio River Basin are polluted, and that waterways in the Great Lakes and Southeast drainage areas exceed the national average pollution level by one-third. California waterways are nearly identical in quality to the national average at 30 percent. One Western State for which a specialized measure of water quality is available shows similar pollution levels.

The Colorado State Division of Wildlife (*19*) has shown that water quality improvement would increase by 2,640 miles or nearly one-third (30.3 percent) the streams capable of sustaining a trout population estimated at 8,700 miles in 1970. Water pollution has been the largest but not the only destroyer of trout fishing supply in the State. Prevention of the de-watering of streams by irrigation and power users would add 917 miles or 11.5 percent; reservoir construction on streams has taken 253 miles or 2.8 percent, by comparison.

Effects of Water Quality on Recreational Behavior

A meaningful estimate of recreation benefits should take into account the competition from recreational opportunities within the area influenced by the proposed water improvement program, according to the Water Resources Council (*31*). There are sound reasons why this is so.

A Wisconsin study by Ditton and Goodale (*12*) provides the best available estimate of: (a) The proportion of existing recreation users who would substitute lower priced recreation sites developed by water improvement programs, (b) the proportion who would experience higher value recreation activity at sites developed by water improvement programs, and (c) the increase expected in the amount of recreation activity resulting from the lower prices. These estimates are presented in table 2.

It seems clear that consumers of water-based recreation today use a number of nearly homogeneous sites without differentiating with respect to water quality. Pankey and Johnston (*25*), in an econometric demand analysis of the recreation use of seven California reservoirs, found that water quality had little effect on recreation use. These waterways were nearly homogeneous, having relatively good water quality. On the other hand, it is known from experience at other water projects that where water quality is extremely bad, recreation use is seriously affected (*10*).

Burt and Brewer (*3*) considered the interrelatedness of the demand for six different waterways when a new reservoir served to lower the costs for certain recreationists. This price change affected the level of demand for recreation at all sites, thus resulting in a net recreation benefit from the introduction of the new recreation site. Cicchetti, Fisher, and Smith (*6*) applied a demand system model in which the demand for recreation at a new site was a function of not only its own price but also of the prices of all its substitutes. They found that this lowered by 16 percent the net benefits of the new site to $1.50 per day. This seems to be a realistic estimate.

Still, the extent to which availability of substitutes affects the recreation benefits of water quality improvement remains an unresolved issue.

If the kinds of water-based recreation activities expected at a site after a water quality improvement program is completed are currently available at alternative sites nearby, then the net recreation benefits per day are expected to be very low, according to a report by Cicchetti, Davis, Hanke, Haveman and Knetsch (*5*). Thus, it is expected that benefits would be relatively sensitive to the amount of clean water available. Russell (*27*) estimated the benefits of improving the quality of the Nashua River in New Hampshire, providing rather weak support for this hypothesis. Adapting a Texas study by Grubb and Goodwin (*15*) to New England seasonal and weather conditions, he found that recreation benefits were relatively insensitive to variations ranging from 0.025 to 0.1 acres per capita of clean water available before improving the Nashua River. The variation in annual recreation benefits ranged from $1,820 in surface acre to $1,720 as the supply of recreation water acreage varied by a factor of four from 1,000 to 4,000 acres. With the necessity of spacing out investments in water quality improvement facilities over a number of years, there is a good chance that the growth in clean water may occur at a rate similar to the rate of growth in demand for water-based recreation. If so, then the shift in water-based recreation from the old facility to the newly restored site would not detract appreciably from the value of the older site, as recreationists closer to the older site increased their recreational activity and new recreationists initiated water-based sports.

When a waterway becomes polluted, most of the former users discontinue its use, and shift to sites with unpolluted water. They substitute higher priced facilities more distant from whers they live, rather than discontinue the recreation activity entirely. For calculating the ratios shown in table 2, a certain symmetry was assumed, in that the proportion of fishermen who shift to alternative higher priced sites when their favorite site becomes polluted, shift back again when its water quality is improved. Certainly, not all current recreationists will shift to lower cost waterways; the best estimate for fishing is very near the Green Bay findings of roughly 80 percent. This is the figure used in this study.

A larger proportion of swimmers indicate a willingness to substitute newly cleaned up waterways (86.3 percent) than fishermen (79.7 percent) or boaters (63.4 percent), according to the Green Bay study by Ditton and Goodale (*12*). This reflects the fact that at very low quality levels, some boating may be possible on a stream. At somewhat higher quality levels, not only may the boating become more enjoyable with less smell to contend with, and less costly with lower boat upkeep, but fishing for a limited number of species may become possible. At still higher levels, water contact sports become possible and fish populations may be upgraded to include sport fish such as bass and trout.

There are thus a number of discontinuities in the benefit curve. For example, public health officials have established quality thresholds that must be attained before any swimming may take place. There has been a general lack of knowledge of the marginal recreation benefits of small changes in water quality. Still, the best available estimate

TABLE 2.—*Major water-based recreational activity and potential changes resulting from a 1 percent change in water quality, United States, 1970*

Recreation activity	Recreation days, 1970 [1]	Proportion of existing users who: [2] Substitute lower priced recreation sites developed by water improvement programs	Experience higher value recreation activity at sites developed by water improvement programs	Potential increase in recreation use resulting from lower prices [3]
	Million days	*Percent*	*Percent*	*Percent*
Fishing	706	0. 80	0. 20	0. 46
Boating	388	. 63	. 37	. 28
Swimming (non-pool)	932	. 86	. 14	. 34
Total [3]	2, 026	. 79	. 21	. 39

[1] Twelve years of age and older (*14* and *2*).

[2] Calculated from data contained in Ditton and Goodale (*12*, p. 94).

[3] Excludes children under 12 years of age. If persons 9 to 12 years of age were included, the number of recreation days would increase by about 16 percent. This would be 8.5 percent for boating, 9.1 percent for fishing, and 21.1 percent for swimming, as reported in the National Survey of Fishing and Hunting, 1970 (*14*, p. 8–9). Less is known about children under 9 years of age. Brewer and Gillespie reported for St. Louis residents that children were as likely to fish and boat as their parents and 50 percent more likely to swim. Number of days recreation by children was not reported, however. If children were included here, participation in outdoor recreation would rise substantially, perhaps by an estimated 35–50 percent, or nearly 1.0 billion days.

is that at least 3 milligrams per liter of oxygen is necessary to eliminate odors and allow boating, according to Davidson, Adams, and Senica (*11*). At least 4 mg/l of oxygen is necessary to allow sport fishing, and at least 5 mg/l of oxygen is necessary to allow swimming.

For the summer quarter, 1972, swimming at stream and lake beaches represented 65.5 percent of total outdoor swimming, including outdoor pools according to a report by Adams, Lewis, and Drake (*1*, p. 5). Some persons may substitute between beach and pool swimming, but for purposes of this study, it is assumed that no substitution occurs. Surely this is not entirely true, even though as Russell (*27*, p. 155) points out, river swimming beaches and swimming pools do not provide identical services. The beach may have an attractive natural setting while the pool is surrounded by concrete. The river water may remain somewhat silty, even though organically and bacteriologically clean, while the pool will be clear. The chlorine in the pool may irritate ears, noses, and sinuses, while the river water will be almost free of chlorine. Clearly, the services provided are not identical, even though the two types of sites both provide swimming opportunity. Russell concludes that it will generally not be true that the services already available at pools are identical with those to be provided by the proposed water quality change.

It should be noted that the Ditton and Goodale survey has certain limitations. A random sample of recreation users was asked: "What would you do if water conditions deteriorated at the place you do most of your boating, fishing, and swimming?" It is important to note that this is hypothetical, and what users say they would do and what they actually would do should polluted water conditions occur are not always the same, though surely related. Also, a small proportion of those interviewed, less than 10 percent, reported that they would stay in the same location and that they would participate less, although how much less was not reported. These users were classified as potential beneficiaries of the second type shown on table 2, while their increase in participation should be classified in the third type. Thus, the increase in value of the recreation experience and increased use is somewhat understated.

Price or Willingness to Pay

A St. Louis study contains the best estimate of travel cost and provides a basis for estimating the potential saving in price per day of the major water-based recreation activities of swimming, fishing, and boating. In addition, preliminary findings of a 1973 Colorado study show willingness to pay for improvement in the quality of water used.

The best available estimate of marginal transfer costs was developed by Burt and Brewer (*3*) who reported costs per vehicle mile of 14.2 cents. These were direct travel and on-site costs, excluding investment costs. With the average number of fishermen, 3.2 persons per party, Burt and Brewer estimated travel costs at 4.4 cents per person. However, the national average number of persons per party was 2.25 in 1970 as reported in a National Survey of Fishing and Hunting (*14*). For purposes of this study, we assume the same average number of boaters and swimmers per party. The vehicle mileage cost of 14.2 cents was divided by the national average number of persons per party of 2.25, thus the average cost per passenger mile becomes 6.3 cents.

An average speed of 40 miles per hour was based on the pioneering work by Clawson (*8*) who estimated average travel distance of 400 miles per day (10 hours). The assumption that rate of travel would average 40 miles per hour may somewhat understate actual travel time. Owens (*24*, p. 11) found that average rate of travel was 27 miles per hour for swimmers compared to about 37 miles per hour for fishermen and boaters. Generally, the shorter trips were associated with lower miles per hour traveled in Ohio.

The time traveling to and from a water-based recreation area should be included as a cost if the length of stay at the area would have been increased had the travel been less. However, if the travel is enjoyable in itself because of roadside scenery, the travel time cost should be allocated to highway benefits and not to the benefits derived from water-based recreation. There is some empirical evidence to suggest that about 50 percent of total outdoor recreation travel can be considered pleasure driving with the views seen on the journey adding to the utility of the trip. However, most boaters, fishermen, and swimmers are destination-oriented recreationists,

and travel time is a disutility detracting from the time available for these activities.

Pearse (*26*, p. 96) found that 95 percent of the travel of a sample of recreation resource users was single purpose. Only 5 percent indicated other purposes, such as sightseeing, visits with relatives and friends, and business activities. According to Horvath (*16*), southeast resident fishermen reported that convenience of travel time was the most important factor in the choice of where to fish, followed by the abundance of fish, and low fisherman population densities at the site.

To do otherwise than to include travel time as part of the price would lead to a consistent downward bias in the value of recreation benefits. Cesario and Knetsch (*4*) have shown why the time cost of travel must be included:

> *Suppose that the money travel cost to a party from City A is $1 and the trip takes 1 hour. If a gate fee of $1 is hypothetically imposed, total money costs become $2. The conventional model assumes that the people from City A will now have the same participation rate ceteris paribus as was recorded for people from City B which is twice as far away, i.e., with travel costs of $2 and 2 hours of travel time. But since travel time from City A has not increased, this assumption overstates the effect of the gate fee in reducing participation. Hence, the estimated demand curve would lie below the true demand curve.*

To include travel time at the approximate minimum wage level of $2.00 per hour increases transfer costs from 6 cents to 11 cents per person mile. Pearse (*26*) valued driving time equal to the recreationist's wage rate. At $4.00 wage per hour, transfer cost would become 16 cents per person mile, or over two and one-half times transfer costs with travel time cost excluded. The estimated total value of recreation benefits would increase by the same proportion. For purposes of this study, the lower estimate of travel time cost based on minimum wage is considered a minimum estimate, and this may rise with further research. Because the issue concerning the cost of travel time is not yet resolved, table 3 shows a range of benefits from water quality improvement. The lower estimate excludes travel time costs altogether. The middle estimate includes travel time costs at $2.00 per hour, and the upper level of the range of estimates includes travel time costs at $4.00 per hour.

An even more unsettled area of research is the willingness to pay for an improvement in the quality of water used. Ericson (*13*) interviewed 144 tourists in August 1973 at Rocky Mountain National Park about their willingness to pay for six levels (represented by six color photographs) of water quality on a visual scale of *worst conceivable* to *best*. Essentially, he obtained a preliminary estimate of the area under the demand curve for each of these levels of water quality. To engage in outdoor recreation activity in an area like the Rocky Mountains, individuals were willing to pay an average of $5.75 per day of water-based recreation to avoid the worst polluted water.

This varied by income level of the individuals, but this effect was less than expected. Those with less than $10,000 income were still willing to pay $4.92 per day, only 14 percent less than the sample average. This compared favorably with $5.33 for those with incomes of $10,000 to $20,000. Individuals with incomes over $20,000 have willingness to pay considerably more, however, at $7.93 per user day.

To avoid water pollution (*percent*):	*Willingness to pay*
20	$0. 97
40	1. 98
60	3. 00
80	5. 06
100	5. 75

These tentative findings suggest that recreational benefits may be small ($0.71) for the first increment of water quality improvement, from 100 percent pollution to 80 percent. This appears to be followed by a threshold between the 60 and 80 percent pollution levels where benefits rise sharply to over $2.00. After the 60 percent threshold is achieved, benefits appear to rise by about $1.00 for each 20 percent increment in water quality.

The estimates assume that the cost of engaging in water-based outdoor recreation does not change as individuals shift from one to another of the five demand curves, one for each level of water quality. In other words, users are not substituting one site for another, as its distance from their residences does not vary as water quality improves. However, individuals were also asked their willingness to travel additional miles to avoid polluted water. Individuals were willing to travel 105 percent farther to avoid polluted water.

To avoid water pollution (*percent*):	*Willingness to drive (percent)*
20	28
40	47
60	69
80	83
100	105

These tentative findings suggest that the relationship between recreation travel and pollution is approximately one-to-one. A 20 percent change in water pollution appears to result in a 20 to 24 percent change in travel to engage in water-based recreation. While this seems to hold true for all levels of water pollution, recreational water users appear to be willing to travel somewhat farther to avoid the mid-range of pollution.

In 1970, fishermen traveled 29.5 billion man miles to engage in the sport, according to a Census study (*14*). This includes salt water fishing, defined as fishing in the ocean, coastal bays, and estuaries, surf, and coastal streams below tidal limits. Fishermen traveled an average of 41.8 miles per recreation day. National measures of travel to engage in boating and swimming were not available from the U.S. Census or from other sources. Census data were available, however, on the number of hours per occasion for each activity. From this, it is possible to derive an estimate of travel for boating and swimming, based on the principle that when individuals allocate time to recreation, they include both travel and the activity. Knowing travel by fishermen, one can derive travel by boaters and swimmers. Travel to engage in boating was estimated as 48 percent more than fishing, and swimming 65 percent more. Thus, boaters traveled an average of 62 miles per recreation day and swimmers 69 miles.

Activity	Hours per occasion at the site [*1*, p. 5]	Number of occasions to equal 1 recreational day (10 hours)	Travel as a percent of fishing
Fishing	4. 4	2. 3	100
Boating [1]	2. 9	3. 4	148
Swimming	2. 6	3. 8	165

[1] Calculated from Census data [*1*, p. 5] showing that single purpose canoeing was 2.[illegible] hours per occasion, water skiing 2.6 hours, motor boating 2.8 hours, and [illegible]ing 4.4 hours. A weighted average was calculated on the basis of the numb[illegible] of recreation days for each activity.

Savings From a Lower Price

First, and most important, are the benefits to existing recreational users who substitute a newly restored lake or stream located closer to their places of residence. Their cost of transportation to the site falls, both in terms of dollars and time. Their average price of recreation declines. Following Mishan (*22*, p. 28), this is identical to the benefit of any investment having the result of reducing the cost of a product or service and thus conferring a savings on the community.

Figure 1 illustrates this benefit to existing recreationists who substitute a newly restored lake or stream, and thus lower their travel costs or price of recreation. Rectangle A is this cost-saving component, and can be illustrated for the major recreation activities of fishing, boating, and swimming (table 3). The annual benefits to participants in water-based recreation activities are estimated at $4.3 billion. They are expected to be $689 million for boating and substantially larger for swimming, $2.5 billion, and fishing, $1 billion (table 3).

These benefits which are shown as column 1 of table 3 were calculated as follows: the potential reduction in the price of fishing, for example, of $1.90 per recreation day, is based on the evidence

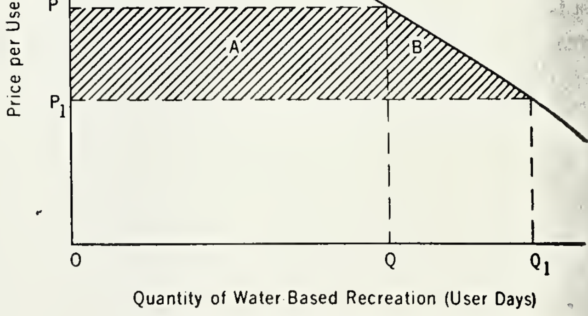

FIGURE 1.—Recreational benefits from a water quality improvement reducing price.

TABLE 3.—*Potential annual economic benefits to recreational users from water quality improvement*

Recreational activity	Recreational days, 1970 (million days)	Increase in economic welfare from: (million dollars)							
		Reduction in the price of existing recreational activity		Additional recreational activity resulting from lower prices		Shift to a higher valued recreational experience		Total	
		Range	Average	Range	Average	Range	Average	Range	Average
Fishing	706	$593–1,533	$1,063	$169–437	$303	$402–1,038	$720	$1,164–3,008	$2,086
Fresh water	592	472–1,222	847	134–347	241	320–828	574	927–2,397	1,662
Salt water	114	121–311	216	35–90	62	81–211	146	237–611	424
Boating	388	384–994	689	93–239	166	398–1, 030	714	876–2,262	1,569
Swimming (nonpool)	932	1,398–3,618	2,508	273–707	490	358–924	641	2,031–5,247	3,639
Total[1]	2,026	2,377–6,143	4,260	535–1,383	959	1,158–2,992	2,075	4,070–10,518	7,294

[1] Waterfowl hunting is also expected to benefit from water quality improvement programs, although by a much lesser amount. In 1970, there were 25.1 million days of waterfowl hunting in the U.S., representing 12.3 percent of total hunting activities including small game and big game hunting of 203.7 million days. If benefits per day to waterfowl hunter are equal to benefits accruing to other water-based recreation users, the total benefits estimated here would increase by $93 million or 1.2 percent.

that 80 percent of existing fishermen are expected to substitute nearer lower priced recreation sites enhanced by water pollution control programs, as shown in table 2. A 40 percent increase in amount of waterways suitable for these recreation activities is expected to reduce travel costs and time by 40 percent for these users. The result of these calculations was multiplied by travel costs of 11.3 cents per mile. The latter estimate of travel cost was derived by dividing the average vehicle mile cost of 14.2 cents per mile presented earlier in this report, by 2.25 persons per vehicle as found in the 1970 survey, plus 5 cents per mile travel time cost at $2.00 per hour. With 40 percent more waterways suitable for recreation, it was estimated that 80 percent of existing fishermen would drive an average of 17 fewer miles per day of fishing. The total benefit to fishermen of $1.90 per day resulted from (1) estimated travel time saving of about 26 minutes valued at $0.85 per day and (2) savings in travel costs of approximately $1.05 per day. Benefits to existing boaters and beach swimmers expected to result from a 40 percent increase in waterways suitable in quality for these activities were calculated in the same way as for fishing. The resulting price saving was $2.80 per recreation day for boating and $3.10 for swimming.

Not all users would be expected to substitute the waterways with newly enhanced water quality, but some would, and the overall effect would be to move downward and to the right along the demand curve for all waterways in the region. Other waterways would become less crowded. And all users would be able to lower their price, should they choose to do so.

This type of user gain from water quality improvement is not likely to be offset by another group's loss because recreationists largely produce recreational services for themselves. As was observed by Cicchetti, Davis, Hanke, Haveman, and Knetch (*5*, p. 4):

> *Unlike the general situation in which a price decrease produces both an increase in consumer surplus and a decrease in producer surplus (which offset each other), a recreationist as both consumer and producer actually realizes a net addition to his social welfare (if a new facility is located closer to his place of residence, for example).*

This is because production costs in the form of annual capital and operating expenses for facilities are relatively small, ranging from $.20 to $.40 per visitor day in public water-based recreation areas, including parking areas, observation points, boat launching and docking facilities, picnic and camp sites, landscaping, water and sanitation equipment, area maintenance, cleanup, and public safety, as reported by James and Lee (*17*, p. 397). If the average annual capital and operating expenses of $0.30 per day were subtracted out of the benefit estimation presented here from a 40 percent increase in waterways of a quality suitable for recreation activities, then the reduction in benefits would amount to about $243 million, or 3 percent of the total benefits presented in this report. It would range from $162 million to $324 million.

Increased Participation Response to a Lower Price

The second basic type of recreation benefit is the increased consumer welfare from the additional activity undertaken, either by the same recreationists or by additional recreationists. Triangle B in figure 1 illustrates this benefit. As can be seen, the consumer's surplus from the additional trips undertaken is but a small fraction of the cost-saving benefits on the original number of recreation trips. Nationally, this benefit is estimated as $1.0 billion for all major water-based recreation activities. It is expected to be only $166 million for boating, but is expected to be substantially larger for swimming, $490 million, and fishing, $303 million (table 3).

These benefits are shown in column 2 of table 3 and are calculated as follows: In the case of fishing, the potential increase in activity days was 46 percent of the 1970 total of 706 million days (as shown in table 2). The result of this calculation was multiplied by the amount by which price is expected to be reduced, $1.90 per day. The derivation of this estimate was shown earlier in the report with respect to the benefits from a 40 percent increase in waterways suitable for water-based recreation activities, shown in column 1 of table 3. The resulting quantity was halved to account for the slope in the demand curve shown in figure 1. Benefits from increased boating and swimming expected to result from a 40 percent increase in waterways suitable in quality for these activities were calculated in the same way as for fishing.

These first two basic types of recreation benefits from water quality improvement can be combined.

The entire strip A and B shown in figure 1 represents the maximum amount of money this group of recreationists as a whole would pay in order to have 40 percent more water of good quality and thus the price of recreation reduced from P to P_1. Together, these benefits are an estimated $5.2 billion annually (table 3).

By comparison, Burt and Brewer (*3*) estimate these combined benefits as $2.43 per user day from investment in recreation water resources 30 miles from St. Louis, Mo. If water quality improvement nationwide succeeded in lowering the average price of water-based recreation by at least $2.43 per day, then based on 2,022 million man-days in 1970, the national recreation benefits would be $4.9 billion annually. This tends to support the results presented in table 3.

Kurtz showed (*18*, p. 79) that a 40 percent reduction in the price of boating was associated with an average increase of 10 percent (ranged from 4 to 25 percent) in the number of boating trips. Davidson, Adams, and Seneca (*11*) estimated that substantially improving water quality in the Delaware Estuary near Philadelphia would increase boating participation by only 20 percent. McNeely and Badger (*21*) showed that a 40 percent reduction in the price of fishing and water contact sports, such as water skiing, was associated with an increase of approximately 40 percent in these activities. Clawson and Knetsch (*7*, p. 84) estimate that for recreation activities generally, a 40 percent price reduction would be associated with somewhat more than a 40 percent increase in the amount consumed.

Tihansky (*30*) drew on the relationship between beach swimming and water quality improvement in Lake Erie and Lake Ontario to estimate that a 40 percent increase in clean water was associated with a 26 percent increase in swimming. Or, for every 1.0 percent increase in cleaned-up beach mileage, swimming within the region increased by 0.65 percent. This is nearly twice the 0.35 increase used in this report (table 2). One would expect the human response to water quality at improved beaches to be substantially higher than that for waterways since most of their shoreline is inaccessible and/or unimproved.

Mathews and Brown (*20*, p. 13) found that about two-thirds (68 percent) of Washington State salmon fishermen would substitute higher cost fishing if they could not fish at their favorite site. About one-third would discontinue fishing. Thus, a resource agency considering the economic feasibility of investment in water quality improvement which would restore the former natural quality salmon fishing in the State could anticipate roughly a 50 percent increase in the amount of salmon fishing as re-entry into the sport by those who had discontinued it or their equivalent in new users. This is nearly identical to the 46 percent potential increase in fishing shown in table 2, and thus tends to support the results presented in this report.

Shift in the Demand Curve Reflecting a Higher Value Recreation Experience

The third basic type of benefit from water quality improvement is a shift in the demand curve resulting from improvements in the quality of the recreation experience. It is the most difficult to measure of the three types of recreation benefits. Nationally, this benefit is estimated as about $2.1 billion, of which $714 million is for boating, $720 million for fishing, and $641 million for non-pool swimming. These benefits are shown as column 3 of table 3 and are calculated as follows: for fishing, the proportion of existing recreationists benefiting from higher valued recreation activity at sites developed by water quality improvement programs is expected to be 20.3 percent of the 706 million fishing days in 1970. This information is shown in table 2. The resulting estimate of the number of days fishing benefited by water quality improvement was multiplied by the estimated willingness to pay to avoid polluted waters of $5.03 per recreation day. Ericson's [*13*] 1973 estimate of $5.75 per day for Colorado tourists was adjusted to 1970, on the basis of the Consumer Price Index. Comparative studies in other regions of the United States are unavailable to test the general applicability of these findings. There is reason to believe that the resulting national benefit estimate is an understatement, at least to the extent that a portion of the 71 percent of the waterways classified here as unpolluted is in some state of partial pollution, as seems likely. Then users would be willing to pay from about $1 to $6 to avoid partially polluted water, depending upon the level of partial pollution.

The estimate shown in table 3 is based on the following situation. When a waterway became polluted, a small proportion of the former users

continued to use it despite poor water quality. They did not substitute higher priced facilities more distant from their place of residence. Nor did they discontinue the recreation activity entirely. When the waterway was first polluted, its demand curve shifted to the left by a large amount. A portion of the demand curve remained above the price line, however, as studies of human behavior show (table 2). Thus, a small amount of use continued. This is because the price paid continued to yield some consumer surplus to some users, particularly for boating, but to a lesser extent also for fishing and even swimming.

Ditton and Goodale (*12* p. 92–96) asked Green Bay, Wis., users: "What would you do if water conditions deteriorated at the place you do most of your boating, fishing, and swimming"? They reported that 28 percent of the boaters would stay in the same location, even though over half of these would participate less frequently. Only 14 percent of the fishermen would not change their Green Bay location, and 10 percent of the swimmers, three-fourths of whom would participate less frequently.

Most studies of the benefits of water quality improvement and other types of investment in natural resource development have treated the problem the same as the development of new water resources, and estimated benefits with and without the project, so that benefits were zero without the project and fully available with it. Stevens (*28*) partially overcame the inability of this approach to treat the problem of a change in the quality of water used for recreational activity. He fitted an econometric model to data on participation by individuals in fishing activities. He used the average number of fish caught per trip as an index of recreational site quality. Based on this earlier work, Stoevener and Stevens, *et al.* (*29*), estimated the damages to fishing quality from alternative locations of a proposed paper mill on the Yaquina Bay, Oreg.

Mathews and Brown (*20*) illustrate the relationship between catch of salmon and net value per day fishing in four regions of the State of Washington: Pacific Ocean Beach, Strait, Puget Sound, and fresh water rivers and lakes. The salmon are large fish that typically dress out at 8 pounds each. Doubling daily catch from 2 to 4 pounds of dressed fish is associated with a 50 percent increase in the value per day from $27 to $40. Value continues to increase for a reasonable range of catch per day (up to 12 pounds per day, possibly higher), but at a decreasing rate. Increasing the catch by the same 2 pounds, but from 8 pounds to 10 pounds per day, increases fishing value per day by only 9 percent from $55 to about $60. These are the only published studies that estimate the relationship between quality and willingness to pay for a particular water-based recreational experience. All other studies so far have assumed that the body of water in question is either available or not available for recreation and thus could not measure this kind of user benefit.

Conclusions

A resource agency considering the economic feasibility of investment in water quality improvement which would restore recreational opportunities in currently polluted U.S. waterways could anticipate roughly a $7.3 billion increase in the benefits to recreation users. These benefits are for fishing, boating, and swimming. Additional benefits to waterfowl hunting are expected to be minor, approximately $93 million annually. The estimate includes a $4.3 billion saving in the average travel and time price to current users. The lower price is expected to stimulate an expansion in water-based recreation activities, the part of both existing and new users, yielding added benefits of about $1 billion. In addition, the demand for water-based recreation is expected to shift to the right as a result of the improvement in the quality of the recreation experience. This benefit is estimated as about $2.1 billion annually.

The benefits shown in table 3 range from a low of $4.1 to a high of $10.5 billion. This reflects the unsettled nature of the issue concerning travel time costs. The lower estimate excludes travel time costs; the middle estimate includes travel time costs at the minimum wage level of $2.00 per hour; the upper level of the range of estimates includes travel time costs at $4.00 per hour, considered to reflect more nearly the wage rates of users in 1970.

From the total benefit estimate should be deducted the added costs of capital and operating expenses to public agencies and private operators, recreation facilities required to support the activities of users. With estimated average costs of $0.20 to $0.40 per day, the reduction in benefits would range from about $162 to $324 million, or

2 to 4 percent of the total benefits presented in this paper.

It should be cautioned that these estimates exclude benefits to children under 12 years of age, owing to the incomplete national estimates of their water-based recreation activity. If these younger children were included, case studies suggest that the estimate of national benefits would rise substantially, reflecting a 35 to 50 percent increase in participation in water-based recreation activities.

Further research is needed in nearly every aspect of the national benefits question. The water-based recreation activities of youth under 12 years of age need to be explored. It would be useful, in the case of further research, to specify the benefits from water-quality improvement geographically by major River Basin. In addition, research is needed on the benefits in moving from current levels of pollution incrementally toward the national goal of clean water. For example, it is not known whether a 10 percent reduction in water pollution results in a 10 percent increase in recreation benefits. In addition to the recreation benefits to users, there may be substantial preservation benefits to the general population. These values result from preserving a level of water quality sufficient to keep options open for both present and future generations. It seems likely that there are long-run and subtle ecological benefits that are not captured in recreational or preservation values. Thus far, they have proved difficult to describe, let alone having a dollar value put on them and being incorporated into a benefit estimate. For these reasons, it seems that present benefit figures represent a conservative estimate of possible total benefits.

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INVESTMENT ANALYSIS: PROBLEMS AND PROSPECTS IN RECREATION, WILDLIFE AND FISHERY MANAGEMENT

Ervin G. Schuster [1]

Abstract

The complexities of investment analysis are viewed as the major problem areas relative to decisionmaking in recreation, wildlife, and fishery management. The valuaation process is condidcred to be the primary area of difficulty. Concepts of social output and cost of acquisition are argued to be legitimate components of an alnalysis. The overriding necessity is to develop a method of analyzing investments compatible with other methods accepted in current use.

Over the past several years, I have been, to varying degrees, involved in both teaching and research related to the economics of wildland recreation. Much more recently, I have had the opportunity to work in the area of wildlife and fishery economics. The degree of similarity between these disciplines is striking. True, the role of underlying disciplines is totally different, zoology and limnology on the one hand and sociology, psychology, design, and communications on the other. But the economic problems and the types of difficulties associated with resource allocation in these disciplines are largely the same.

Economists, from a wide range of sub-disciplines, have been grappling with many of these resource allocation issues for years. But where are we today? I'm sorry to report that our impact on solving problems within the context of land management has been negligible. Could it be that we have been too theoretical, or have we been talking to ourselves? Or, just possibly, have we not really correctly understood and articulated the problem?

Let me briefly share with you some thoughts concerning economic problems pertaining to either fish and wildlife or recreation management. Let me begin by describing the nature of the problem—as I see it. This will quickly lead into a discussion of "values" and "valuation". The central thesis of this paper is: While questions pertaining to resource valuation are important, a much more important set of questions concerns selection from alternative management activities in recreation, wildlife, and, fishery management. I intend to suggest an approach to evaluation of these opportunities that will facilitate the overall quality of decisionmaking in natural resource management. But first, what about the problem?

The Problem

It seems to me that one major question continually asked is: "What is the value of the resource?" What resource? It really makes little difference—the wildlife resource, steelhead, a wilderness area, or a wild and scenic river will do. The point is that the answer to this question seems relevant only to a restricted set of decision opportunities; the cost of this exclusive concentration has been the almost total ignorance of other types of decisions. The literature is literally filled with attempts to answer the resource value question.[2] Indeed, it seems that much of the utility of pursuing such a question falls in the realm of academic inquiry or propaganda. If answers can be developed, one antagonist can say to the other: "See, this river is more valuable as a wilderness than as water to fill a reservoir behind a dam." Admittedly, the value of a resource may be im-

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[1] Author is assistant professor, College of Forestry, Wildlife, and Range Sciences, University of Idaho, Moscow, Idaho.

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[2] The diversity of approaches to resource valuation is reflected in the following: Beardsley, Wendell. Economic value of recreational benefits determined by three methods. USDA Forest Service Research Note RM176. 1970. Gordon, Douglas. An economic analysis of Idaho sport fisheries. Idaho Cooperative Fishery Unit. CA 1973.

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portant in certain decisions—even critically so—and I have been narrow-minded and overstated my position. But I don't believe this is the real problem in land management today.

What then is the real problem? Before answering, we must look at the "real" decisions and the decisionmakers. The latter first. I am concerned with the Forest Service—the region, forest, and district level offices—the Bureau of Land Management, State fish and game agencies, the National Park Service, State park and recreation agencies, and more generally, agencies dealing with activities oriented to recreation and/or fish and wildlife management. Personnel in these organizations are called upon to make program decisions that not only affect wildlife, fishery, and recreation, but also the tenor and overall quality of wildland management. These are classical decisions in economics—they involve the allocation of scarce resources. I believe that economics shold play a major role in these decision processes by facilitating the "evaluation of alternatives". What kind of alternative? That depends on the level of decisionmaking. But the alternatives I have in mind may be systems of land management activities in a land-use planning context; they may be alternative ways a recreation manager can spend a given budget and others. The decisions concerning me are being made by resource managers rather than legislative officials.

It seems that the common denominator—and, coincidentally, the real problem area—devolves to investment analysis. Some investment opportunities, such as fertilization and precommercial thinning in timber management, are often recognized, while others—including spawning gravel rehabilitation and planting winter cover—are not recognized as investments. In all cases, decisions necessitate commitment of public resources—dollars and others—to certain activities with some expectations as to an array of outcomes or benefits. The goodness of any particular alternative is typically expressed in terms of the relationship between the benefits and the associated costs. Modern investment analysis deals with these problems.

There are few conceptual or empirical problems in accounting for costs. Benefits pose the problem. Certain areas of land management have been, and continue to be, plagued by so-called "non-market" and "intangible" benefits. If investment analysis can provide the focal point for decisionmaking, then wildlife, fishery, and recreation can serve as examples of areas in deep trouble. These are the areas riddled by so-called non-market benefits and intangibles. These are the areas that often can't compete effectively for a budget dollar. These are the areas for which no viable system to evaluate benefits exists. We need such a system. Moreover, the real world of decisionmaking mandates that this system be compatible with other evaluation systems. It hasn't and won't work to evaluate timber investments by the "real system" and recreation investments by "another system". *Postulate I:* Decisionmakers yearn for comparability and "evenhandedness" of analysis. But while we are discussing these matters, land management decisions are being made—or mismade, as the case may be. Let us work in the direction of consistency in evaluation. Too many years have gone by in the quest for "correct" answers. May I suggest that it is less important to be right or correct in an absolute sense than it is to be consistent. In many decision situations entailing evaluation of alternatives, knowledge as to the absolute "goodness" of the alternatives is not required. Rather, decisionmakers need information indicating the relative goodness. Most analyses do not require global solutions, but instead, call for solutions that are unique to decision situations. It is to the end of "compatibility" and "relative goodness" in evaluation that the remainder of this paper is aimed.

Values and Valuation

The rudiments of investment analysis are easily depicted and apply equally to wildlife, recreation, timber, and other investments. An essential element in an analysis is knowledge of physical productive relationships—a production function, if you wish. Somehow, inputs must be related to outputs. This is the first major area of difficulty. Knowledge of the physical, biological, or social relationships implicit in recreation, wildlife, or fishery management activities is often shaky. But let us assume adequate knowledge concerning the production function. This means we have a handle on both the types and levels of physical inputs and the corresponding types and levels of physical outputs. And, very importantly, we know about the temporal distribution of these inputs and outputs. Investment analysis evaluates the relationship between inputs and outputs over time.

Economists usually facilitate the investment analysis process by employing the concept of "value". Economic investment analysis then investigates the relationship between the value of the inputs and the value of the outputs or benefits over time. Many evaluation criteria are available—internal rate of return, cost-benefit ratio, social accounting, and others.

But the key to any criteria is "value". Herein lies the difficulty with previous work to assess the value of a resource: it is not clear that the same "value" information useful in making dam versus salmon-run decisions is particularly useful in evaluating proposals to develop a hatching channel or prune a timber stand. Furthermore, it is not clear that the methodology used to develop different types of value information need be the same; consider the differences in stumpage value (appraisal) procedures as opposed to determining the value of a forest resource. *Postulate II:* Each decision situation is associated with a unique set of decisionmaking information; universally pertinent information is an anomaly. Value of inputs (costs), except for "side-effects", usually poses few problems. Value of outputs has historically been a roadblock. This area will now be discussed.

Values

Economists have dealt with the question of value for centuries. A labor theory was suggested as well as a use theory and an exchange theory. The exchange theory has dominated in recent years. Let us accept the following as a working definition of economic value:

> *The worth of a thing as measured by the amount of other things for which it can be exchanged, or as estimated in terms of a medium of exchange.*

Within the context of investment analysis, the "things" we attempt to value are inputs and benefits.

But investment analysis in the fields of recreation, wildlife, and fishery management is said to be different. It is sometimes asserted that economic value is inappropriate; the more appropriate value is "social value". I believe this to be a misnomer, resulting from a gross misunderstanding. In any reasonably correct sense, social value are ideas. They define for members of a culture what is worthwhile and what is not, what objectives should be pursued, and what goals are to be preferred over others. *Postulate III:* The term "social value" is more often incorrectly used, within the field of land management, than it is correctly used. To illustrate, when asked, "What are the social values of fish and wildlife resources?", typical responses are esthetic pleasure, hunting, bird-watching, and peace of mind. The list is long. But very seldom will a true social value be found. What one most often finds are "reasons why" (motivating forces) people do or want things or activities (behavior)—but not social values. Examples of possible social values include "cheating is wrong" and the "sanctity of animal life".

Is this lack of correct term usage important? You bet! It complicates efficient communications, muddies thought processes, and promotes misdirection in teaching, research, and management. But most importantly, it is now reasonably well accepted that the role of economics is sharply limited in recreation, wildlife, and fishery management. Many of the so-called "social values" are, in point of fact, either benefits or activities. Are there economic implications to acquisition of these benefits or consumption of these activities? There sure are! Do these benefits and activities have economic value? Yes!

In a real world and very pragmatic sense. the magnitude of total value for outputs of land management is determined: total value=(price) (quantity). While this convention measures worth by a medium of exchange, other measures are possible—but not realistically practical. Price-quantity relationships dominate real world analysis. It is important to note that in investment analysis, we are ultimately concerned with total value and not simply price (unit value). Equilibrium conditions for the reasonably free consumer stipulate that consumption will stabilize, *ceteris paribus*, where:

$$\frac{MU_1}{P_1}=\frac{MU_2}{P_2}= \cdots =\frac{MU_n}{P_n}$$

The following discussion will deal with the relationships between quantity, marginal utility, and price.

Valuation

The process of assigning values to the outputs of recreation, wildlife, and fishery management has gone on for many years. This effort has been besieged by many difficulties. The difficulties encountered may well relate to inability to operationalize the components of value—quantity and price.

Quantity

We may begin this discussion of quantity demanded by saying $Q_x = f(P_x, MU_x)$, *ceteris paribus*. Two questions seem particularly relevant to recreation, wildlife, and fishery management: how are outputs defined and how are these output to be measured?

Social Outputs.—From an investment analysis standpoint, what are we producing with a spring browse burning program? Most would not answer "a new level (pounds) of elk forage per acre", but rather, "elk". What are we producing with a tree seeding operation? Most analysts would not answer "trees", but rather, "board feet or cubic feet of timber." Is there any dissimilarity in the types of response? There is. Does it make any difference? It does. On the one hand, output of wildlife investment is expressed in physical terms while the timber investment is in social terms. The elementary distinction being made is between physical output and, if you will, "social output". Social output has to do with the way people perceive physical things.

Social perception(s) transforms physical items into commodities—goods and services. The same tree may be perceived as "board feet" (a good) to some and a thing to picnic under by others (a service). Yet, particularly in the field of fish and wildlife management, the analysis is usually terminated at the physical output level. But what is it that gives an elk value? People. The opportunity to pursue it, eat it, take its picture, or simply to know it exists are a few ways people perceive elk. What is the process by which board feet are consumed? In general, let's say a timber sale. How about elk? Hunting, photography, and sitting in a living room thinking about the wild elk in Idaho's Selway-Bitterroot Wilderness Area are just a few processes for "consuming" elk. It is social output and not physical output that is important in analyses. And when you start looking at social output, many distinctions between wildlife/fishery and recreation management start to disappear. *Postulate IV:* When viewed within a social output context, recreation, wildlife, and fishery management jointly produce the same products.

Benefits and Behavior.—Modern economics, more than other areas of social science, tends to focus on the results and ramifications of human behavior. Processes involving the "whys" of behavior are usually left to psychology, social psychology, and sociology. That is to say, we (economists) are concerned with the behavior of consuming three hamburgers per day at 50 cents each, *ceteris paribus*. We are typically much less interested in the "whys": inner tranquility, physiological drive reduction, status seeking, or masochism. We are concerned with the implications of an indifference surface, not *why* it has a given shape.

And yet, the process valuing the outputs of recreation, wildlife, and fishery management has been stifled by not clearly making the distinction between "why" and behavior *per se*. How? We often attempt to value the benefits—the "whys"—and not behaviorial activities. A visit to the opera would seem to share many of the benefits associated with a wilderness experience—status, intellectual stimulation, tranquility, and peace of mind. But in the case of the opera, the economist looks at consumptive behavior. Imagine the difficulty in assessing the value of the output if we attempted to determine the worth of status or peace of mind to the consumers. Instead, we simply look at consumptive behavior that says 250 seats are sold each evening at $5.00 each.

May I suggest that economics should be concerned with attempts to determine the value of social output by investigating consumptive behavior. Consider the case of a spring burning program intended to increase forage production, thus allowing for a higher level of elk population. The following listings illustrate the distinctions between physical and social output as well as benefits and behavior:

Physical output	Perceived benefits	Social output	Consumptive behavior
Elk	Meat	Hunting experience	Hunting man-days.
Elk	Peace of mind	Nature watching	Camping man-days.
Elk	"Chase"	Hunting experience	Hunting man-days.
Elk	Artistic fulfillment	Photography experience	Sightseeing man-days.

Consumptive behavior is revealed in the process of acquiring a product (social output) for some reason (benefit obtained) from a physical object. The above convention recognizes that several people do the same thing for different reasons and that one person may receive multiple benefits from a single experience.

One final thought, relative to quantity, compels attention. Recall that $Q_x=f(P_x, MU_x)$, *ceteris paribus*. Recall also, that the mechanics of economic theory are somewhat conditioned by the assumption of perfect knowledge and information on the part of decisionmakers. The validity of this assumption seems particularly shaky in the area currently being analyzed. The impact of imperfect knowledge and information is that utility acquisition is not known with certainty. The salmon fisherman doesn't know if a salmon will be caught any more than a novice wilderness enthusiast knows whether tranquility will actually be obtained. In short, consumer expectations are subject to acquisition likelihoods—probabilities. These probabilities may be consciously perceived of a subjective type or a stochastic type. In any case the probability of acquiring—$P(MU_x)$—benefits is usually not equal to unity. Hence, instead of working with MU_x, we should be working with expected marginal utility: $EMU_x = P(MU_x)MU_x$. Therefore: $Q_x=f(P_x, EMU_x)$, *ceteris paribus*. Inclusion of probabilities not only has an impact on the quantity demanded but also serves to effectively define commodities. This may be why, *ceteris paribus*, one may be willing to spend more for a day of fishing in a commercial pond than in an unknown, wild stream. Alternatively, with identical prices, the rational consumer would fish more at the commercial facility than in the wild environment. General equilibrium conditions should now be expressed:

$$\frac{EMU_1}{P_1}=\frac{EMU_i}{P_i}= \ldots =\frac{EMU_n}{P_n}$$

. . . where i represents a social output

Price

The second component of valuation relates to the question of price. Under "normal" circumstances, prices are easily identified because they are revealed by the market. But many of the outputs of recreation, wildlife, and fishery management are termed nonmarket or extramarket. Basically, this means that price and quantity determinations are not made through an established market. It is this fact that has kept us from making any viable and believable judgments on output price and hence total value. Any judgment on price in a nonmarket context would not be comparable to "market-established" prices. For we know that other prices prevailing in resource and product markets are "pure" and facilitate achievement of welfare optimality conditions. We all know that stumpage price, grazing fees, as well as the price paid to secure the services of a railroad fireman or a camera, meet all desired conditions of economic purity. The hard fact of economic reality is that competitively determined prices are almost nonexistent. The real world reflects "cost-plus" pricing, administratively determined pricing, monopoly prices, strategic prices—almost everything except competitive prices. Moreover, these prices are often unevenly administered.

What are prices anyway? They are certainly unit revenues to the producer. But the producer, in many recreation, wildlife and fishery cases, doesn't receive any revenue. No revenue; no price; no market; no value. Right? Wrong! For the other side of the price coin is the consumer. Prices are also unit costs to the consumer—they reflect value to the consumer.

Postulate V: Public decisionmakers need not rely on revenues received to assess the value of output in the same way as do private decisionmakers. Consumer-incurred costs hold the key to output value determination in recreation, wildlife, and fishery management. Let's look at this idea a bit.

Economic theory says that a consumer, with a given budget and faced by an array of prices, will allocate his budget in such a way that the ratio of marginal utility and price is the same for all commodities. We have already discussed the question of marginal utility as it relates to quantity demanded. The price—per unit cost—is what the consumer must give up or forfeit to acquire the expected marginal utility. But is the standard market price all that a consumer must forfeit? I think not.

In the theory, economic-activity centers—resource and product markets—are either implicitly or explicitly assumed to be operationally costless. The cost of transacting business is zero. This is a usefully simplifying convention, but only that. Reality tells us that 50 cents each is not what

the consumer must totally forfeit to acquire the utility associated with a quart of milk.

Postulate VI: "Price" (to a consumer) is the summation of all the per unit costs associated with acquisition of a good or service. I believe this is the basis upon which consumer decisions are made.

This is such an important point that it must be pursued. The dollar paid for 2 quarts of milk at 50 cents per quart is a true reflection of the value of milk if the consumer lives in the store's dairy case. The demand curve for milk is similarly valid. Move the consumer 2 miles, or 200 miles from the store and the demand curve will shift. I have violated *ceteris paribus*, you say? Maybe yes, maybe no. Within the conventional wisdom of price, I certainly have. But if price were accepted to be "cost of acquisition", then a demand curve would represent the locus of iso-acquisition cost points. Any given point could be developed by an infinite combination of "store-prices" and other attendant costs. I believe this view makes sense in terms of a consumer decision process; each point on the demand curve represents what the consumer is willing and able to give up.

So you say, "You are simply throwing acquisition of complementary goods in with acquisition of the primary good." Conventional economic wisdom would support this criticism. My retort would be, "The definition of what constitutes a product to be a hamburger, we do not define it to be, nor do we buy and sell, a meat patty, one bun, a tomato slice, and a pinch of salt!" A hamburger is itself a package of things. Similarly, a day of wilderness experience or hunting is a package of things. The point is, economists may be defining products too narrowly. I am suggesting that you approach consumer economics by viewing the consumer as a decisionmaker and analyze behavior through standard production economics concepts. The consumer is producing utility, if you will, through consumptive behavior which necessitates certain activities; in equilibrium, the value of the consumptive behavior is reflected by the total of what the consumer has given up.

If any of the preceding makes sense, then we can relabel price as "cost of acquisition". By resurrecting and infrequently used term, we can say that cost of acquisition equals price (standard version) and "transaction costs".

Postulate VII: Costs of acquisition are not a weak approximation of unit value; they are a true measure of unit value to the consumer. I am not suggesting that this is a new concept; many others have considered the question of costs in a resource valuation context.[3] What I am suggesting is the complete legitimacy and applicability of this concept in investment analyses.

The upshot of this dialogue is what I believe to be a more realistic view of consumer behavior. Inclusion of transaction costs has two major impacts on the process of valuing outputs of recreation, wildlife, and fishery management. First, the broader definition of costs is perfectly compatible with the expanded concept of social output. Think of the benefits associated with a hunting experience, including meat, the chase, and others. We are now saying that to secure this social output, one must give up resources in terms of license costs, gasoline costs, food and lodging costs, and others. Social output created by recreation, wildlife, and fishery management should be defined in terms of a package of benefits acquired through consumptive behavior and the "value" should reflect a package of acquisition costs. The goodness of an investment should then be based on the value consumers associate with consumptive behavior. The second impact addresses the question: Are these goods and services really non-market? Or, are many of these social outputs simply allocated through multiple markets? Consider the case of birdwatching. True, we do not sell tickets. But, do not the gasoline, food, lodging, and other markets effectively allocate birdwatching opportunity? In this context, is there anything non-market about birdwatching, a wilderness experience, or fishing? General equilibrium conditions should now be expressed:

$$\frac{EMU_1}{CA_1} = \frac{EMU_i}{CA_i} \cdots = \frac{EMU_n}{CA_n}$$

. . . . where i represents a social output
. . . . CA represents cost of acquisition

Consolidation

Will the concepts of social output and valuation through acquisition costs facilitate the expressed

[3] For example see: Clawson, Marion and Jack L. Knetsch. Economics of outdoor recreation. The Johns Hopkins University Press. 1971.

Environmental Research Group. Executive summary—economic survey of wildlife recreation. Georgia State University. 1974.

goal of compatibility of investment analysis evaluation? I believe they will. Currently, the most easily analyzed investments are in the areas of timber and range management. In both cases, the output of management activity is already expressed in a social context. So to argue that fishery management activity results in man-days of fishing rather than fish or that expenditures in recreation give rise to visitor-days of picnicking, is simply arguing for consistency in output definition. If we can accept the notion of social output as legitimate, then a major step has been made toward compatibility and comparability of investment analysis.

But the more important issue in the analysis is determining the worth of these social outputs. Here, we may have to supplement the way traditional outputs are valued. Recall, it was suggested that public agencies should look at what a consumer must forfeit to acquire the output; this reflects output value to the consumer. In the case of timber, this means that stumpage value, because it is a residual, incompletely reflects acquisition costs. For comparability, logging and transportation costs must, at a minimum, be added. Where do the additions stop? Frankly, I'm not sure. But I do believe that stopping at the mill receipt level would be analogous to a fisherman's consumption of a fishing experience.

Table 1 suggests how a set of quite different management activities can be placed in a common format. Greatly simplified, only one output is associated with each management technique. Ridiculous? Yes. But the point is: if this skeleton were accepted, then we can commence to put some meat on the bones. For instance, we also know that man-days of photography is another way people utilize elk; this could be included, as well as others. We also need to determine the temporal flow of benefits and land management costs; this may be a job for research. What about data on acquisition costs? I don't know. A great deal of information is already available; but I'm not sure as to relevancy.

The major points I am making can be summarized thusly:

1. Too much effort concerning valuation in recreation, wildlife, and fishery management has been directed toward resource values at the expense of decisions essentially involving investment analysis;
2. Decisionmakers in natural resource management need a system that will both evenhandedly evaluate management opportunities and give use to determinations of relative desirabliity regarding decision alternatives;
3. Some outputs of management activities are defined in physical terms while others are in social terms; every effort should be made to define all outputs in a manner reflecting people perception—a social context; and
4. The quantity of output consumed and the attendant acquisition costs truely reflect value to the consumer.

Even if the approach recommended is accepted in spirit, much work needs to be done. What is the impact of public goods? The problem of externalities still plagues the analysis. What about the double-counting problem? There are many other problem areas. But if accepted, this methodology may provide a means of analyzing so-called nonmarket goods in a way that enhances comparability of analysis and improves decisionmaking.

TABLE 1.—*Sample relationships between management techniques and acquisition costs*

Management technique	Physical outputs		Social outputs		Unit value or acquisition cost	
	Description	Units	Description	Units	Price element	Transaction cost element
Thinning	Trees	Number per acre.	Harvest	MBF	Stumpage	Logging costs and others.
Planting	Grass	Pounds per acre	Grazing	AUM	Grazing fee	Herder's wage and others.
Burning	Elk	Number per acre.	Hunting	Man-days	License	Logging costs and others.
Development	Sites	do	Camping	Visitor-days	Entrance fee	Transportation cost and others.
Stocking	Fish	do	Fishing	Man-days	License	Boat rental and others.

MEASURING ECONOMIC COSTS OF WILDERNESS LAND ALLOCATION

Wendell Beardsley, Dennis Schweitzer, and Douglas Ljungren [1]

Introduction

It seems unusual to us that studies of the economics of outdoor recreation have focused almost entirely on benefit evaluation and demand analysis. Identification and measurement of the economic costs of providing outdoor recreation, supply analysis have been, with few exceptions (*2*, *6*), generally ignored. The focus on benefit evaluation contrasts with the more traditional "production" concerns of resource economics and forest land management: the measurement of economic costs of alternative management patterns as a basis for political decisionmaking. In this paper, we discuss the possibilities for developing useful information of this sort about the economic cost of reallocating multiple-purpose forest land to Wilderness.

There appears to be widespread agreement that information on economic costs of resource allocation is badly needed. Forest Service Deputy Chief Thomas Nelson said in a recent speech that "before recommending (a Wilderness) to the Congress, we must ascertain that it is available. That is, what values must be foregone if it is designated a Wilderness? What are the trade-offs? What are the mineral values that will be tied up? The sustained-yield timber harvest foregone? Or the recreational potential never developed?" (*7*)

Others who have considered the applicability of economics to these sorts of questions argue that it is inappropriate ["the ordinary economic laws of the marketplace are of little use in determining whether Wilderness Areas can be economically justified" (*3*)], or even impossible ["the wilderness experience is a thing of such esoteric or spiritual value that economics can have nothing to do with it" (*1*, p. 28)]. Our basic premise, in contrast, is that economic analyses of land allocation for wilderness purposes are needed for two reasons.

First, many decisions will have to be made before the National Wilderness Preservation System (NWPS) is complete; about 40 million acres of *de facto* Wilderness and study areas on Federal land other than National Parks have been identified as potential additions to the NWPS (*8*) and, as a result of its Roadless Area Review and Evaluation, the Forest Service has selected 274 areas totalling 12,189,000 acres for study and possible addition to the NWPS (*10*).

Second, we believe economic analysis can be appropriate and useful in Wilderness allocation decisionmaking in two ways: (a) To help ensure that all pertinent costs and benefits of alternative courses of action are identified and counted (*5*), and (b) to enable use of a more rational logic of choice among the alternatives (*2*). There are, however, a number of thorny conceptual issues and measurement problems to be resolved.

In this paper, we explore some of these intricacies, the most important and difficult of which we believe is identifying all the costs of creating a Wilderness. We define costs as values that must be foregone in order to have Wilderness, noting the obvious point that Wilderness classification can change the flow of goods and services an area provides. We focus on those flows that are diminished, and discuss the problems of identifying, quantifying, and describing them for decisionmakers, using three successively more complex approaches, each measuring a somewhat different kind of cost: (a) What is foregone and what is its value; (b) what would it cost to "replace" those values from other lands; and (c) who gains and who loses from land reallocation decisions such as these.

[1] Respectively, associate professor, Iowa State University, Ames, Iowa; principal economist, Forestry Sciences Lab., Forest Service, Missoula, Mont.; and graduate student, Iowa State University, Ames, Iowa. (The preparation of this paper was financed through a cooperative agreement between Iowa State University and the Intermountain Forest and Range Experiment Station, USDA Forest Service.)

What is Foregone to Have Wilderness?

To measure foregone values, we must quantify current and future values obtained under the most likely non-Wilderness pattern of management, and the net reduction in these values that would result from Wilderness designation of the area. The reduction is the opportunity cost of Wilderness.

We can catalog a host of activities and opportunities that generally must be foregone under Wilderness classification, including:

—road-dependent recreation (except, perhaps on the fringes) and capital-intensive recreational developments, such as ski areas;
—capital improvements for grazing or for water control;
—mining, at least as under yet-to-be-defined controls;
—opportunities to manipulate the forest or the land to reduce fire hazards or to improve or protect wildlife and fish habitats; and, lest we forget
—commercial timber harvesting.

Given some more thought, this list could be extended and greatly refined. But the more difficult task comes in quantifying what would have happened but now will not. Timber production provides a relatively familiar example for illustration.

Ideally, to determine the volumes of timber that must be given up requires developing a current inventory of timber stands, projecting their development (perhaps under intensified management), and establishing dates for future harvesting. Making projections of stand development is a straightforward job (though plagued with data problems), but establishing harvest dates is not. Those dates depend on market conditions and Congressional appropriations for transportation systems, intensified management practices, and a host of related tasks, such as preparation of environmental impact statements.

Let's push this illustration a little further. Historically, timber-producing lands in what are now candidate Wilderness Areas were included in long-range harvest planning. Even though accessibility constraints dictated that early harvesting be carried out elsewhere in the forest planning units, the level of past cutting was predicated on the assumption that future harvests would come from the candidate areas as well. Wilderness classification of large areas implies that future cutting will have to be concentrated elsewhere and previously cut lands will have to be reentered earlier than anticipated. To the extent that current and future reentries are limited, either because there will not have been time for adequate timber regrowth or because ecological recovery of watersheds will not be complete, Wilderness classification will cause a further reduction in harvesting on the planning unit as a whole. Such indirect impacts also must be counted as costs.

When we try to estimate how the other biological resources would have developed, we encounter similar complications. More difficult, however, is the task of predicting how people would have used an area. But some kinds of sensible assumptions must be made about the probable pattern of use and development of various areas, and the subsequent flow of values each would provide.

Great care must be taken to identify the values that will, in fact, be foregone. To be legitimately countable as a cost in the form of a value foregone, there must be an absolute scarcity of places where an equivalent value might be obtained. Many have noted that such a small proportion of forest land has been proposed for Wilderness status that the remaining lands can probably be more heavily exploited to make up for any lost opportunities, such as commerical timber production. To the extent that is true, foregone values tend to be overstated. But such judgments are both place- and time-dependent. For example, there may be many alternative timber production opportunities in regions where only a few very small Wildernesses are likely to be created relative to other regions where, because a large proportion of the productive timberland base has already been designated as Wilderness, such opportunities have been severely restricted. And, there were many more alternative production opportunities when the first Wilderness Areas were created than there are now.

Once these hurdles have been overcome, the opportunity cost of Wilderness classification or any other kind of land zoning has the virtues of being relatively inexpensive to measure and easily understood. This approach was, for example, used to measure the costs of Wilderness by the Outdoor Recreation Resources Review Commission (ORRRC) in 1962 (*8*), and by the Forest Service in the recent RARE study (*10*). An important implicit assumption is that total social value is reflected by the selected measures of opportunity cost. Distributional effects of reallocations of

lands are not analyzed—a point we return to later when discussing techniques that specifically analyze ways in which benefits and costs are distributed among various groups.

What is the Replacement or "Compensation" Cost?

Measuring the compensation costs of foregone values is an extension of the opportunity cost approach. This technique is addressed to the question: What is the cost of maintaining the *status quo* in communities that derive economic benefits from candidate Wildernesses?

Again turning to the timber example, compensation cost is the sum of extra costs necessary to manage the remaining commercial forest land in a timbershed more intensively, so overall harvesting remains constant. The ORRRC in 1962 recommended that forest management on lands not withdrawn from timber production be greatly intensified for precisely this purpose (*8*). More recently, the Report of the President's Advisory Panel on Timber and the Environment endorsed this approach, reasoning that "less than 5 percent of the national total has been reserved for purposes other than timber production. It seems reasonable to conclude that the remaining 95 percent can be so managed to more than compensate for forest lands lost to commercial timber production through withdrawals for other purposes" (*4*).

An alternative to intensifying management on other commercial forest land may be available on a limited scale by moving to, say, small private holdings that have not previously supplied timber products. However, whether management is intensified on nonreserved lands in the timbershed or harvesting is moved to forest areas not previously part of the timber base, an opportunity cost of a secondary nature is incurred, i.e., the presently existing opportunity to exploit these alternatives and thereby provide a net addition to harvest levels will no longer exist.

A central conceptual difficulty in measuring compensation costs lies in defining opportunities that will, in fact, generate "equivalent" goods and services. To illustrate this problem, we note that elsewhere in this symposium, George Stankey suggests that many of the social values received by recreationists are not dependent upon a particular forest setting. Equivalent personal values can be obtained in a variety of near-natural contexts, and it seems likely that this applies to many values now obtained from candidate Wildernesses. Similarly, in most instances, equivalent timber can be produced elsewhere. For example, in the northern Rockies, logging costs are generally reduced and product quality improved when second-growth stands replace the wild stands found in candidate Wildernesses; in contrast, the opposite tends to be true in the coastal regions of Oregon, Washington, and California, where there can be substantial quality (and perhaps cost) advantages of harvesting old-growth timber. And in addition to these sorts of "compensation-in-kind" schemes, there may be a range of other forms of compensation, such as retraining or relocation of workers adversely affected by changes in land use.

An additional consideration is deciding on whose economic *status quo* is to be maintained. Concern has usually focused on local communities and, more specifically, on local timber-dependent mills. In most instances, mills have a fairly large purchasing area from which they can draw timber. In Federal timber sales (which provide our frame of reference), because appraised stumpage prices are calculated as a residual after allowances are made for operating costs, increased transportation costs tend to be balanced by lower stumpage prices, total costs to the mill remain constant. We note, however, that lower stumpage prices imply reduced payments to both local units of government (via the 25 percent in lieu of taxes fund) and to the United States Treasury. From those broader perspectives, replacement timber from a distance may not be economically equivalent to reserved timber.

A practical difficulty in making compensation cost analyses results from the way Federal timber management and road construction are financed. Harvesting in previously uncut areas is generally self-financing with reforestation, stand improvement, and other costs deducted from stumpage values. But intensified management to accelerate tree growth in nonreserved areas initially requires out-of-appropriations investments. To the extent that such Congressional appropriations are uncertain. the credibility of such analyses is also uncertain. On the other hand, tying specific investment costs to the economic maintenance of particular communities is politically attractive and might make appropriations more likely.

Whose Ox is Gored?

If our focus of concern is on maintaining the economic vitality of the total community rather than the *status quo* of particular businesses, trade-offs of new Wilderness-dependent economic activities for those that existed before Wilderness become important. In some instances, a decline in timber-related jobs is accompanied by an increase in tourist industry jobs. Once the economic changes that will follow Wilderness classification have been identified, community economic impact studies can trace the consequences through a local economy and suggest who will gain, who will lose, and by how much. Both input-output and economic base studies have been widely used to examine the impacts of changes in commodity production levels and, less often, to examine the more general implications of land reallocation.

Economic cost studies often have not identified who would bear the costs of reallocation, although the National Environmental Policy Act is an attempt to ensure this will be done in the future. While it is becoming common to learn how local and national economies fare, there are other kinds of "who suffers" breakdowns. For example, it is worthwhile to break costs into private costs and social costs—to define the impact of reduced timber harvesting on incomes and profits generated by a mill, on tax revenues, on payments to the unemployed, and on the relocation of displaced wood product workers.

These kinds of analyses come in many degrees of sophistication. Those (such as input-output analysis) that are usable in answering the most difficult questions are the most complex and most subject to misinterpretation; they are also the most demanding of data and the most expensive. To the degree that those with specialized economic training are a scarce resource within government agencies, the potential usefulness of these studies will not be realized. On the other hand, opportunity cost and compensation cost analyses are more easily understood and applied.

The principal characteristics of the three discussed techniques for defining the economic costs of classifying areas as Wilderness are summarized in table 1.

Aggregate Costs of Potential Wildernesses

The techniques we have discussed here can partly define the costs of allocating land to Wilderness. Although many costs (and benefits) are not yet amenable to dollar evaluation, even a partial cost analysis will be useful in decisionmaking, if it is accompanied by an explanation of its assumptions and omissions.

For example, a supply curve depicting the opportunity cost of foregone values in a candidate area might appear as in figure 1. An increasing sacrifice of values would be necessary to have an increasingly large portion of the area designated as Wilderness. This example portrays a situation in which land with no alternative value-producing capability and then blocks of increasingly productive land might be added to the Wilderness system.

TABLE 1.—*Summary of purposes, assumptions and data requirements of principal techniques for measuring foregone values*

Techniques	What it measures	Principal assumptions	Principal data requirements	Other comments
Opportunity cost studies.	Lost economic values.	Units of measure selected summarize important values.	Values that will be foregone.	Basic to other techniques. Easy to understand. Inexpensive.
Compensation cost studies.	Cost of ameliorating local economic losses.	Equivalent values can be obtained from other areas. Financing the production of such values is not a barrier.	Values that will be foregone plus costs of producing equivalent values elsewhere.	Maintaining local benefits politically attractive. Medium cost.
Community economic studies.	Economic changes in all sectors of community.	Community economic interrelationships remain constant.	Values that will be foregone plus relationships among economic sectors.	Most thorough analysis. Most expensive in dollars and expertise.

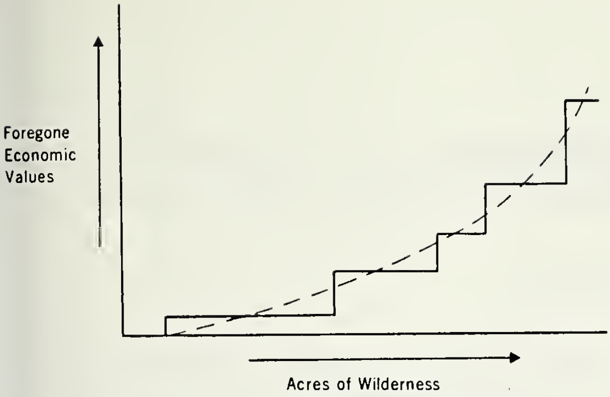

FIGURE 1.

For the same area, a supply curve depicting compensation cost for a Wilderness of various sizes would rise somewhat more steeply to the right. The degree of steepness will be proportional, first, to the extent to which—in the case of timber—intensified management is already practiced on other land and few unexploited opportunities remain for increasing its productivity. And second, as more acres are withdrawn, increasing the intensification of management on nonreserved forest lands nearby must eventually involve less productive investment opportunities. Third, if several areas are being withdrawn at the same time, even less productive investments may have to be made to maintain total harvest levels, further steepening the curve. But since the areas of timber-producing lands that are under consideration for classification are generally small relative to all such lands, we doubt this effect is of great significance.

The same pattern would be exhibited by a curve depicting compensation cost for road-dependent recreation opportunities. A supply curve would be steeper if existing, road-dependent recreation areas are currently being utilized at full capacity, few sites suitable for recreation remain undeveloped, and several Wildernesses are being created in a given region further limiting the land available for developed recreation.

These kinds of cost analyses can be extended to include other nontimber costs resulting from Wilderness designation, such as the loss of opportunities to develop water and grazing resources and, perhaps, increased costs of mineral production due to costs of imposed environmental and amenity protection measures.

Conclusion

We conclude by restating an important beginning contention of this paper: that cost analyses of potential land reallocation decisions may, at present, be more useful to the decisionmaker than benefit analysis. They can provide reliable information that is comparable for a Wilderness of various possible sizes or for a regional or national system of areas. Until reliable and generally accepted benefit quantification procedures are developed, cost analysis can define the impacts and values associated with alternative courses of action and can provide a factual data base for political decisionmaking.

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EFFECTS OF IMPROVED RESEARCH METHODS ON THE VALUE OF RECREATIONAL BENEFITS

Richard G. Walsh [1]

Increased attention has been focused in recent years on improving our understanding of the economic value of outdoor recreation activities. Use of standard approaches to estimate the price and, subsequently, the benefit of public expenditures on natural resource preservation or development may lead to very questionable policy recommendations. The primary reason is that some private and public expenditures are not included in most recreational user demand studies. In addition, there appear to be measurable external or social benefits which may exceed user benefits. This paper explores a number of proposals that have been made in recent years to improve methods of research on the value of recreation benefits.

Until recently, the approach of most Federal agencies was to select a Water Resources Council (*28*) value ranging from $0.50 to $6.00 per day, depending upon the relative degree of specialization and substitution for the recreation activities being valued. Over the past decade, it has become more and more apparent that these standard values have tended to understate true values by a substantial amount (*16*). Thus last fall, the Council (*29*) inflated these values by the rise in the consumer price index of approximately 50 percent, to a range of $0.75 to $9.00. Although this was an improvement, the approach still provides a rectangle value that nearly always understates recreational benefits, owing to the inelasticity in the slope of the demand curves.

Figures 1 and 2 from Knetsch (*16*) illustrate this shortcoming of the Council values. In figure 1, at zero price, 1,000 people will visit the recreation site. This is a point on the demand curve AB. The value of the recreation benefit becomes 1,000 times, say $1, drawing from the lower range of the Council standards, or a total of $1,000. This is the area OBCD in figure 1. However, this approximation of the benefits seriously overstates their value as shown by the willingness to pay criterion of the area under the demand curve AB. This is the area OBA. On the other hand, with a demand elasticity of unity in figure 2, the Council standards would again show a benefit of $1,000, while the correct benefit would be far larger as shown by the area OBA under the demand curve.

Major advances in recreation research methods are expected, however, under the new standards of the Water Resources Council. For the first time in the valuation of outdoor recreation, resource planning agencies such as the Forest Service, U.S.D.A., may take the well-known travel cost approach. Here, value is the sum of the area under a demand curve, derived from the variable costs of automobile operation and miles driven. Also, if a fishing license or other use fee is charged, this may be added to travel costs. Although the method is still relatively rare, a growing number of studies have taken this rather inexpensive approach in recent years. Unfortunately, the method understates recreation values for a number of reasons, including the frequent exclusion of transfer costs other than auto operation, and limiting miles driven to one-way rather than round trip.

Fortunately, the Council guidelines encourage us to improve the marginal travel cost approach. No one method has proven completely satisfactory. With full explanation, we may select whatever combination of research methods provides the best measure of willingness to pay by the consumer. Thus, we are interested in what can

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[1] Professor, Department of Economics, Colorado State University, Fort Collins, Colo. (This paper was prepared under an Intergovernmental Personnel Exchange Act contract with the Environmental Protection Agency, Washington, D.C. The author acknowledges helpful comments by Jack L. Knetsch and by a number of seminar participants.)

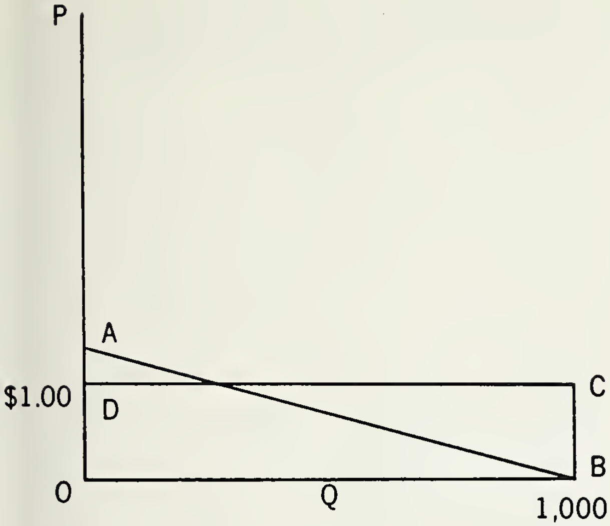

FIGURE 1.

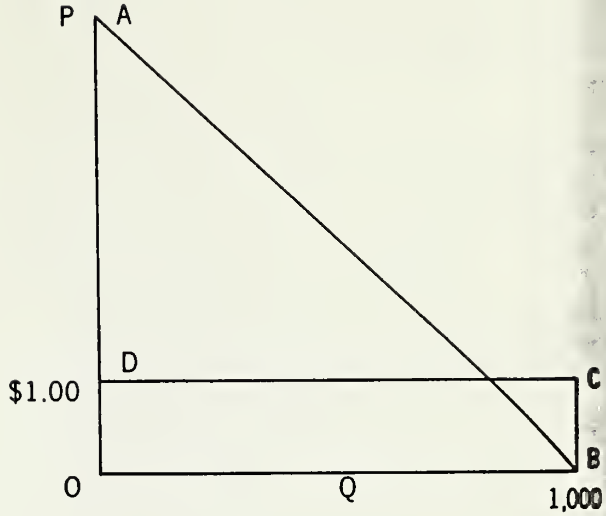

FIGURE 2.

be learned from the recent experience of researchers to help formulate realistic measures of the value of recreation benefits in the future.

The purpose of this paper is to describe the nature of several recent innovations in estimating methods, and to assess their effects on the value of recreation benefits. It is shown that differences in estimating methods are an important cause of divergent estimates of the value for recreation benefits. In a field where the general methodology is in a highly evolutionary state, a number of proposed innovations are embryonic and not so well developed or so persuasive that we all can agree on their general application. Still other recent innovations are so self-evident, reasonable, and realistic as to become immediately adopted nationwide. I expect that general agreement will be forthcoming with respect to the following innovations in research methods:

(1) Direct transfer costs in addition to variable costs of auto;
(2) Travel time cost, the disutility of driving;
(3) Substitution effects of other sites;
(4) Public investment and operating costs.

While a recent review of the literature on the value of recreation benefits has led me to favor, with some reservations, the following innovations in research methods, the agencies have not adopted them as yet and prospects are mixed:

(5) Consumer investment costs, the long-run incremental costs;
(6) Economic value of the time allocated for consumption at the recreation site;
(7) An equity adjustment of the values derived, reflecting the estimated marginal utility of money for income groups;
(8) Values external to the consumer transaction, such as preservation or option values.

Transfer Costs

First, economic theory which supports the travel cost approach to benefit estimation is conspicuous in its failure to suggest that cost of recreation activity be limited to direct automobile costs. In addition to gas, oil, and auto repair costs researchers should be willing to include all direct transfer costs of the recreation experience: license and entrance fees; lodging; food costs when more than at home; consumable supplies such as film, bait, and shells; guide service; rental of equipment, and the like. The pioneering study by Brown, Singh, and Castle (*3*) included these transfer costs in its definition of marginal cost. Contrary to Gibbs (*12*), I am convinced that the price or willingness to pay variable should include both travel costs and onside transfer costs combined into one price variable.

Limiting marginal costs to auto costs was justified in the past on the basis of least effort and the belief that the slope of the demand curve was determined by direct automobile costs and miles driven, not by other transactional costs. Moreover, the food and lodging consumed may not be "mean

to an end" but rather an "end" in themselves, at least in part. All this may have been true, but the resulting value of recreation benefits was strictly arbitrary and understated by a substantial amount.

Cichetti, Fisher, and Smith (*9*, p. 35) report: "It can be shown . . . increasing travel costs by a given proportion has the effect of increasing benefits by the same proportion." They suggest that a St. Louis study by Burt and Brewer (*5*) provides a sound estimate of marginal transfer costs at 14.2 cents per vehicle mile or 4.4 cents per person. This includes all direct expenses of the trip, including travel, lodging, and other transfer costs. The estimate is two and a half times the standard measure of direct costs of vehicle operation by the U.S. Department of Transportation (*27*), which shows variable costs of 5.5 cents per vehicle mile or 1.7 cents per person. A Corps study published this year used an even lower estimate, 1.46 cents per person mile (*1*). Including transfer costs and travel costs together in the price variable will have a substantial effect on the value of recreation benefits.

Travel Time Cost

Second, indications are that for most users of recreation resources, travel time is a part of travel costs. The time traveling to and from a recreation area should be included as a cost if the length of stay at the area would have been increased had the travel been less. However, if the travel is enjoyable in itself because of roadside scenery, the travel time cost should be allocated to highway beautification benefits and not to benefits derived from any recreation activity. There is some empirical evidence to suggest that about 50 percent of total outdoor recreation travel can be considered pleasure driving with the views seen on the journey adding to the utility of the trip (*20*, p. 421). However, most recreationists, such as hunters and fishermen, are destination oriented, and travel time is primarily a disutility detracting from the time available for these activities.

Pearse (*21*, p. 96) found that 95 percent of the travel of a sample of deer hunters was single purpose. Only 5 percent indicated other purposes such as sightseeing, visits with relatives and friends, and business activities. Horvath (*14*) reported that Southeast resident fishermen rated convenience of travel time as the most important factor in the choice of where to fish, followed by the abundance of fish, and low fisherman population densities at the site.

To do otherwise than to include travel time as a part of the price would lead to a consistent downward bias in the value of recreation benefits. Cesario and Knetsch (*7*) have shown why the time cost of travel must be included:

> Suppose that the money travel cost to a party from City A is $1 and the trip takes one hour. If a gate fee of $1 is hypothetically imposed, total money costs become $2. The conventional model assumes that the people from City A will now have the same participation rate *ceteris paribus* as was recorded for people from City B which is twice as far away, i.e., with travel costs of $2 and two hours of travel time. But since travel time from City A has not increased, this assumption overstates the effect of the gate fee in reducing participation. Hence, the estimated demand curve would lie below the true demand curve.

This problem can be easily solved (*17*) by holding travel time cost constant for each observation so the added price is the added travel and other transfer costs associated with each increment of added distance.

To include travel time at the approximate minimum wage level of $2.00 per hour would more than double transfer costs from 4.4 cents to 9–10 cents per person mile. In a somewhat less arbitrary approach, Pearse (*21*) valued driving time equal to the recreationist's wage rate. At a $4.00 wage per hour, transfer cost would become 15–16 cents per person mile, or two and a half times transfer costs with travel time cost excluded. The estimated total value of recreation benefits would increase by the same proportion.

Substitution Effects

The Water Resources Council (*29*) recommended that a meaningful estimate of recreation benefits should take into account the competition from other recreational opportunities within the area influenced by proposed resource development programs. Burt and Brewer (*5*) considered the interrelatedness of the demand for six different lakes when a new reservoir served to lower the costs for recreationists nearby. The new site affected the level of demand for recreation at all sites, thus lowering the net recreation benefit from the introduction of the new recreation site. In a more recent study, Burt and Brewer (*5*) estimated that building a proposed corporation

reservoir in Missouri would reduce benefits from recreation at existing reservoirs by about 40 percent.

Cicchetti, Fisher, and Smith (*9*) applied a demand system model in which the demand for recreation at the proposed Mineral King ski site was a function of not only its own price but also of the prices of all of its substitutes. They found that this lowered by 16 percent the estimated net benefits of the new site. They concluded that it is realistic to consider the choices of recreationists among alternative recreation sites. Its magnitude depends on the location of the site and the users.

Despite these and other efforts, the extent to which availability of substitutes affects the benefits of recreation resource development remains an unresolved issue. One investment theory would have us ignore the negative pecuniary effects of a new development on older sites. The question becomes only one of whether potential users are willing to pay for the new site. Another group of theorists suggests that if the kinds of recreation activities expected at a new site are currently available at alternative sites nearby, then the net recreation benefits per day would be very low (*8*). However, the development of recreation resources could be programmed at a rate similar to the rate of growth in demand. If so, then the shift in users from the older facilities to the new would not detract from the value of the old, as recreationists closer to the older sites increased recreational activities there, and new entrants initiated recreational activities at both old and new sites.

Public Investment and Operating Costs

There are some production costs to public agencies such as the Forest Service and to private operators of facilities required to support the recreational activities. If these costs are not covered in fees paid by users, they should be deducted from the value of recreation benefits.

Private operators of recreational sites include variable costs along with annualized investment and other fixed costs in the price they charge users of their facilities. Accounting practices of public agencies exclude annualized costs of investment in facilities and the opportunity cost of land resources. The latter is consistent with the economics of short-run planning, which considers variable costs only. In long run planning, investment and other fixed costs become variable, and would be included in economic analysis. For this reason, public agencies might well consider adopting long-run planning techniques. It seems certain that the social and environmental consequences of most outdoor recreation management decisions are long run. Until the disparity in private and public accounting practices is resolved, allocation of resources for outdoor recreation preservation and development will continue to be somewhat distorted.

Production costs (including annual capital and operating expenses for facilities) vary widely, and are believed to be relatively small, ranging from 20 to 40 cents per visitor day in public water-based recreation areas. Included in this estimate are parking areas, observation points, boat launching and docking facilities, picnic and camp sites, landscaping, water and sanitation equipment, area maintenance, cleanup, and public safety (*15*).

The fact that these production costs are usually small has an important economic implication. Recreation user benefits are not likely to be fully offset by social losses because recreationists largely produce recreational services for themselves. As has been observed: "Unlike the general situation in which a price decrease produces both an increase in consumer surplus and a decrease in producer surplus (which offset each other), a recreationist as both consumer and producer actually realizes a net addition to his social welfare (if a new facility is located closer to his place of residence, for example)" (*8*).

Investment Costs

Another serious difficulty with many studies has been that consumer investment in recreation equipment was not included in the price estimates. This has resulted in a further underestimate of the relative value of recreation benefits. For it is included in the price of everything else the consumer buys. In the case of Rocky Mountain trout fishing, including annualized investment costs had the effect of increasing former estimates of value by approximately two-thirds. A Colorado study (*19*) included annualized costs related to recreation use of family vehicles, recreational vehicles, cabins, and land, special clothing, sporting equipment, and miscellaneous investment costs. These costs were 42 percent of average total expenditures for

fishing, $30.83 per day. Consumer surplus averaged a realistic $16.60 per resident fisherman day. It should be noted that the study included the depreciated annual value of investments by single-purpose fishermen only and may overstate true levels somewhat. For an example of a low estimate, a Louisiana study (*25*) showed annual investment costs of local fishermen as $1.67 per day.

Recreation investments may substitute for variable expenses; for example, the purchase of a boat may substitute for rental. The procedure is simple enough to obtain the inventory and original cost of the durable recreational equipment owned by the sampled families. It appears that annualized or depreciated investment costs vary widely in contrast to variable costs, which tend to be similar for all recreation activities at the same site. In the Louisiana study (*25*), the recreation equipment costs for fishing averaged $1.67 per user day, compared with $43 for boating, water skiing, and swimming.

If annualized investment costs are distributed among individuals in the same proportion as variable costs, then the slope and vertical intercept would be increased and consumer surplus would be increased by the ratio of investment costs to variable costs. It can be hypothesized, however, that each recreationist might have exactly the same investment cost, then the demand function would shift to the right with no change in consumer surplus. The increased area under the demand curve would be offset by the increased costs of the individual recreationists. Also, an inverse relationship between a recreationist's investment and variable costs can be hypothesized. Then it would be possible to arrive at a lower estimate of consumer surplus when including investment costs in the estimation of recreation demand. This seems unlikely, since surveys show that investment and variable costs are positively correlated (*4*).

Money Time Price

Theoretically, the total price which consumers pay for recreation while at the site includes (1) the money price per day and (2) the amount of time allocated for the consumption. The wage rate is a reasonable minimum estimate of the value of this onsite recreation time.

To include recreation time would have a substantial effect on the value of recreation benefits. A Louisiana study (*25*) of the Atchafolaya Basin estimated the time price of fishing as about $38 per 12-hour day, somewhat less at $27.50 for boating, water skiing and swimming because of the large numbers of youth included. These are two to three times values using the travel cost approach.

The method also suffers from inability to differentiate among different types of fishing or other recreation. It is only common sense to question the view that every day spent in any kind of recreation is equally valuable (*11*, p. 150). However, time is only part of recreational price and assuming uniformity for individuals may still prove acceptable.

Seifert has argued that to include recreation time would overstate the value of recreation only if individuals would like to work more than they currently do. (*23*, p. 205). He thinks that if we are to ever measure total recreation benefits, this monetary value of recreation time must be added in. Most disagree; for example, economists with the U.S. Army Corps of Engineers (*25*). My own view is ambivalent; from a practical point of view, the exaggerated estimates of benefits are useless for decisionmaking. Theoretically, I am attracted by the logic of Seifert or, more properly, Lionel Robbin's neoclassical labor leisure model developed in 1930.

This model can be illustrated in figure 3 from Seifert (*23*).

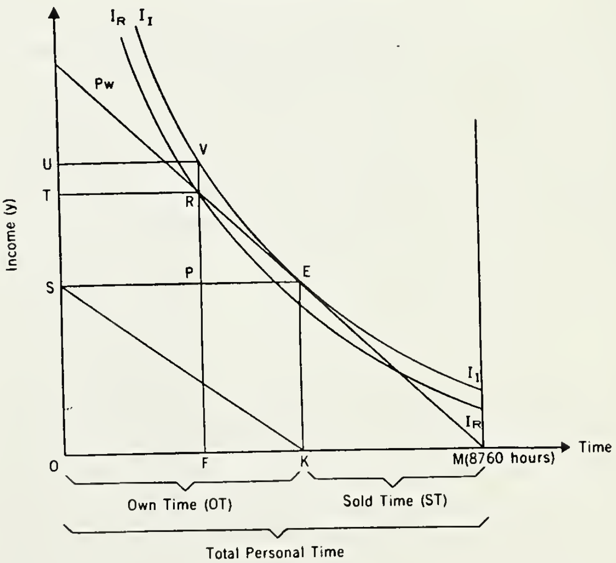

Figure 3.

Along the horizontal axis, we measure total personal time per period (OM, here equal to one year=8760 hours) and along the vertical axis, we measure income (Y), which stands for all goods except time. Sold time (abbreviated as ST) is total personal time per period *actually* exchanged, spent, or used in the market for the earning of money income (Y). Own time (OK) is defined as total personal time per period (OM) minus sold time (KM). $I_1 I_1$ represents the indifference curve of an individual, indicating the various combinations of (Y) and (OT) which are indifferent to the individual P_w his hourly wage rate and (E) the equilibrium situation, i.e., (KM) hours of sold time are exchanged for (EK)=(SO) units of income (Y) per annum. (OK) are the remaining own time (abbreviated as OT) hours available to our individual, *including* among others the OR hours. Let (FK) represent this portion of his own time hours which he spends as OR time (e.g., vacation time). Then at the going wage rate P_w, our individual is actually foregoing (RP)=(TS) units of (Y) in exchange for (PE)=(FK) hours of OR leisure, i.e., the income opportunity cost of his total OR time amounts to (TS) of (Y) per year. Furthermore, should it be desired to induce our individual to work during his OR time (FK), we see that just paying him the going wage rate P_w would not suffice, for at R he is definitely worse off (i.e., on a lower indifference curve $I_R I_R$) than at E. To make him as well off as before would require payment of a premium of *at least* (RV)=(TU) dollars, or a higher wage rate for the additional (FK) hours of sold time supplied.

We can say therefore, that the reason why the individual is actually *not* working during his OR time, preferring the leisure time to work, is, because the income opportunity cost (RP), or the market price of (FK) hours of OR time, is smaller than the "real" value of (FK) to the individual, which is at least (PV) dollars. Thus, he enjoys an "OR-surplus" of (RV) dollars. In other words, the value of own time, the price of OR time in particular, is *at least* P_w per hour.

Equity Adjustment

Some types of recreation benefits will accrue disproportionately to the poor living primarily in the large metropolitan areas. Adjusting for the estimated marginal utility of money to income groups increased the estimate of recreation benefits in New York State by 14 percent. This reflects increases in net benefits to households below the poverty level ($3,000) of 84 percent and reduction in net benefits to those with incomes of $10,000-14,999 of 30 percent (*24*). The progressive income tax structure provided a basis for weighing the relative utility of recreation benefits to income groups.

Income class	Marginal Federal tax rate	Welfare weight
Under $3,000	0.06	1.8
$3,000 to $5,999	.10	1.1
6,000 to 9,999	.11	1.0
10,000 to 14,999	.16	.7
15,000 and over	.28	.4

The notion of differing marginal utilities of income remains an unsettled area of economics. If wants are viewed as a function of means, then the utility of a dollar to any man, rich or poor, is likely to be the same. However, the more acceptable view in the United States seems to be that the rich man does not value a dollar as highly as a poor man. Indeed, there is evidence that Congress has acted on this principle in setting up the progressive income tax structure, and on a number of other things. The value of recreation benefits perhaps should be shown with and without this equity adjustment.

Preservation Value

In addition to the recreation benefits to users, there may be significant benefits to nonusers from preservation of natural resources for outdoor recreation activities. These values are by definition external to the consumer transaction and are thus indirect values. In the past, they were often placed in the intangible category where they remained, discussed but not measured. Even today, few measures of the value of preservation benefits are available.

It is known that esthetic values are associated with maintaining natural resources in relatively undisturbed condition to keep options open for both the present and future generations. Until estimates of such values are completed, the benefits to society from recreation resource management will continue to be underestimated. For such glamour resources as the salmon runs of the Pacific

Northwest or the redwood forests, a large number of individuals may be concerned, and their total benefits may exceed total user benefits, even though nonuser preservation benefits may be much smaller per individual.

Recent studies have identified a preservation value among a large group of nonusers. Meyer (*18*) estimated that the annual benefits of preserving in its natural state the Fraser River system average $223 per resident household in British Columbia. This added 54 percent to the estimated benefits received by salmon fishermen in the basin. A recent study of the Four Corners power plant, transmission line, and strip mining developments used a bidding game to estimate the preservation value to New Mexican residents and tourists as about $85 per household (*22*). Horvath (*14*) estimated an average value of $24.54 to Southeastern U.S. resident households from aquatic observation and esthetic enjoyment. The Southeast wildlife study did not ask nonusers to estimate option value attached to the likelihood that they will be able to fish in the future. However, nonfishermen estimated the daily benefit they would have assigned to fishing as $29 per household, or about one-third less than the value assigned by those who reported fishing.

Meyer and Horvath (*18, 14*) both attributed preservation benefits to the entire regional population including recreation users. Others have suggested that the measure is appropriate to nonusers only, on the principle that preservation benefits to recreation users may have been captured in their willingness to pay for current use.

Conclusions

For the first time in the valuation of outdoor recreation resources, planning agencies of the Federal government may take the well-known marginal travel cost approach. Here value is essentially the sum of the area under a demand curve, derived from the variable costs of automobile operation and miles driven. Unfortunately, this understates recreation values for the many reasons discussed in this paper. Federal standards encourage the agencies to select whatever combination of research methods provides the best measure of willingness to pay by the consumer. To include direct transfer costs, such as lodging and consumable supplies, along with direct auto costs seems realistic and meets with general agreement by researchers. It has the effect of increasing costs per user mile from about 1.7 cents to 4.4 cents. Also, to include a cost estimate of the disutility of travel time may eventually become widely adopted among researchers. At the minimum wage, this increases costs per user mile by 5 cents to 9.4 cents. This is five and a half times the basic mileage cost figure of 1.7 cents per person and would be expected to increase the value of recreation benefits by a like proportion. From this amount should be deducted two variables. First, the substitution effect among recreation sites reduces the value of any single site—in the case of California ski development, by an average of 16 percent of transfer and travel time cost. In addition, the capital and operating costs of the Forest Service recreational facilities should be deducted. These vary widely, but for reservoir recreation have been estimated as 20 to 40 cents per user day.

Other possible improvements in estimating procedures will be less widely accepted. Some studies have included consumer investment costs and other long-run incremental costs as a part of price on the basis that public decisions should be based on long-run marginal costs. Annualized investment costs were 42 percent of the estimated value of fishing benefits in Colorado of $16.60 per user day, but they vary widely, as would be expected.

In addition, there are theoretical grounds for including the economic value of the time allocated for consumption at the recreation site. At minimum wage levels, this would add $24 per 12-hour user day, or at actual wage levels, it added $38 to the value per fisherman day in Louisiana. I doubt if the procedure will ever be widely used because the exaggerated estimates of benefits are seldom useful in practical decisionmaking.

Especially important in urban areas is an equity adjustment of the values derived, to reflect the marginal utility of money for income groups. It increased basic values per user day in New York State by about 14 percent, but the effect is expected to be negative nationwide. Finally, values external to the consumer transaction, such as the preservation value of scenic recreation resources, seem to be widely accepted by researchers, although empirical studies available at this juncture are few. It appears that preservation values may add as much as 54 percent to recreational user values.

The selection of the eight research proposals discussed above is not meant to minimize the possible importance of other innovations in research methods which may also affect the value of recreation benefits. Recently, Brown, Singh, and Richards (*3*) explored the possibility of using individual rather than group combinations of distance zone data, having the effect of increasing the average daily value of salmon and steelhead fishing in Oregon from $8 to $20. Even where a value of the fishing experience can be determined with a reasonable degree of accuracy, the question remains as to how much of this can be attributed to the fishery. The recreation experience may be made up of a combination of activities yielding satisfaction in addition to catching fish. A number of resources may contribute in varying proportion to each of these satisfactions. For example, the shoreline may produce forest scenery accounting for 20 percent of the total satisfaction from fishing and 20 percent of the value of recreation benefits. However, it may be found that management of the forest accounts for only 10 percent of the resources committed to providing the fishing experience. Clawson and Knetsch (*10*) urged that recreation land value enhancement be added to user values in estimating the benefits of recreation developments, and a number of studies have been made. A Colorado study found that tourists were willing to pay 123 percent more for land adjacent to unpolluted waterways, indicating that this may be a substantial benefit. Some of this value which benefits landowners up to 1 mile away may already be captured in recreation user benefit estimates.

A National Survey of Fishing and Hunting for 1970 showed that 10.8 percent of the total fishing in the U.S. by individuals 12 years of age and older occurred within a distance of 1 mile from the residences of fishermen, accounting for 5.3 percent of the total travel costs of fishermen. A very minor amount of fishing occurred between 1–5 miles of the fisherman's residence, about 0.4 of the total, accounting for 0.1 percent of total travel costs. Another problem is that youth under 12 years of age are excluded from nearly all estimates of the value of recreation benefits. If these younger children were included, the estimates of recreation values might rise substantially, reflecting a 35–50 percent increase in participation counted. How to value the benefits per user day to youth under 12 remains an unresolved question. Including benefits to future generations of consumers would seem to offer promise as a means of improving recreational planning.

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Part IV—A Sociologist Among the Economists

SOME SOCIAL CONCEPTS FOR OUTDOOR RECREATION PLANNING

George H. Stankey [1]

Abstract

Increasing competition for funds has increased the necessity for recreation managers to have accurate measures of outdoor recreation's costs and benefits. However, because many of the values of recreation cannot be measured in economic terms, it is important that other social sciences be utilized in addition to economics. Seven important concepts that provide added depth to our understanding of recreation behavior are discussed in this paper, including: (1) The recreation opportunity spectrum; (2) recreational preference; (3) substitutability; (4) carrying capacity; (5) dependent satisfaction; (6) externlities; and (7) cost effectiveness.

Coupled with economic analyses, these concepts offer recreation planners increased understanding of the various costs and benefits associated with alternative courses of action. Additional work is needed to refine these concepts into operational guidelines in the form of specific criteria.

The theme of this symposium centers on the contributions economics can make to recreation planning. Competition for money is increasing, and tightening budgets have increased the need for better measures of outdoor recreation's costs and benefits. Efforts to further refine the economic measures of recreation should be continued and strengthened. But it is the premise of this paper that the concepts offered by economics only partially answer the problems recreation managers confront. The concepts of a variety of social sciences will be needed as research attempts to aid decisionmakers.

The social sciences include many disciplines, ranging from psychology, cutural anthropology, and geography to history, as well as economics. The social sciences are joined by a common thread that attempts to explain man—as an individual, as a member of society, and as a resource user. Each individual discipline has developed a unique perspective on man. For instance, economists look at the mechanisms whereby we allocate scarce resources; psychologists are concerned with the processes that influence an individual's behavior with regard to the environment around him.

Each discipline provides important insight on how and why people seek recreation and on how recreation programs can best fulfill human needs. Disciplinary boundaries are foggy at best. For instance, geographers studying recreationists' behavior have drawn heavily on concepts and methods used by psychologists and sociologists. The point is that participation in recreation, like all human behavior, is complex. The greater diversity we bring to bear in examining recreational behavior, the more likely we can develop accurate notions about it.

What concepts can we draw from the social sciences that will aid recreation managers, particularly when coupled with the economic concepts outlined by other speakers at this symposium? In the following discussion, I have attempted to organize a number of diverse notions and perspectives from the various social science disciplines into a set of concepts for recreation planning. These include: (1) The recreation opportunity spectrum; (2) recreational preference; (3) substitutability; (4) carrying capacity; (5) dependent satisfactions; (6) externalities; and (7) cost effectiveness.

The Recreation Opportunity Spectrum

The basic premise of the recreation spectrum concept is that a variety of environmental settings "from the paved to the primeval" (*29*) are needed to fulfill the many needs, motivations, and preferences that lead people to participate in outdoor

[1] Research social scientist, Forest Service, Intermountain Forest and Range Experiment Station, (stationed in Missoula, Mont., at the Forest Sciences Laboratory, maintained in cooperation with the University of Montana). This paper is adapted and revised from an article entitled "Criteria for the determination of recreational carrying capacity in the Colorado River Basin." *In*: Environmental management in the Colorado River Basin, ed. by A. Berry Crawford and Dean F. Peterson, Utah State University Press, 1974, p. 82–101.

recreation. One of the dominant themes to emerge from recreation research has been the existence of a wide range of tastes and preferences among users. These include such diverse dimensions as socialization and challenge. Different kinds of outdoor settings differ in their ability to satisfy these various dimensions. The opportunity spectrum concept recognizes the existence and legitimacy of these various motivations. The fundamental issue facing planners, then, is not one of "either-or" or even "how much" (*23*), but rather, of establishing a dynamic balance across the entire continuum (*6*).

We can specify four important principles concerning the spectrum:

1. It is not defined by a quality contiuum. Quality is measured by the extent to which participants are able to experience their desired dimension of satisfaction (*30*). Providing quality recreation, then, becomes a matter of providing a package of opportunities that permits people to choose alternatives to best provide the satisfactions they seek. For instance, quality camping for some is the opportunity to experience solitude. For others, it is the opportunity to socialize with new friends. In each case, the activity is the same, but the product is different.
2. We can define the spectrum by several criteria. For instance, one recent paper suggested space requirements, desirable frequency of contacts among users, participant objectives, development required, access, and mode of transportation as criteria for defining the spectrum (*23*). Although other criteria might be relevant in defining the spectrum, these will emerge from research and experience. The point is, the spectrum is founded upon the presence of a range of conditions within each criterion.
3. What happens to one part of the spectrum can influence other parts of the system. For example, we find few examples of programs for providing dispersed recreation opportunities (with the exception of classified Wilderness). However, research has shown that many Wilderness visitors desire an experience that could be better supplied in other locations (*32*). Because of the gap in the opportunity spectrum (or in knowledge about other opportunities that do exist), this use and its associated impacts are directed at an opportunity that is relatively scarce and subject to rapid, often irreversible, change.
4. The opportunity spectrum is dynamic. The range of activities found along the opportunity spectrum can change over both time and space. However, changes in activities, brought about perhaps by technology (e.g., snowmobiling), might simply reflect new outlets for value systems that remain fairly stable.

Data are available that give us some clues on how and why people move about the opportunity spectrum. For instance, the process of learning certain skills (e.g., how to get along in the woods) appears to lead to a shift toward more demanding kinds of opportunities (*2*, *7*, *18*). However, such changes might be linked to gradual changes in the environmental conditions on different sites. As conditions change (use levels increase, more facilities are developed, etc.), those aspects of the site that once attracted users are lost. Persons using this site similarly change; new conditions repel former users while attracting new ones. This process of "invasion and succession" (*6*) may help explain declining participation rates in some recreational activities (*19*).

The opportunity spectrum should be viewed as an objective for recreation planning; that is, when the programs of the various recreation suppliers (e.g., Federal government, State government, private sector, etc.) are considered, we should find a broad, diverse set of alternatives from which people can choose. However, competition for resources from other users and other forms of recreation means that choices about what will be provided, where, and by whom will never be completely free. Given these constraints, coupled with the uncoordinated fashion in which recreation is provided,[2] the opportunity spectrum will not, in all likelihood, evolve. Other concepts, therefore, must be used to assist recreation planners to provide diversity.

The Concept of Recreational Preference

The Federal Land and Water Conservation Act of 1964 requires States to prepare recreation plans based on use projections derived from demand studies. However, most of these demand studies simply project past consumption. They do not reflect demand.

Demand is a technical term that refers to the quantity that would be consumed at different price levels. However, the typical demand study is based upon an examination of past participation at a set of given opportunities, coupled with an

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[2] There are over 20 Federal agencies with recreation-related programs and over 200 different organizations at the State level. County, municipal, and other public jurisdictions, as well as a growing private sector, further cloud the picture.

estimate of the future growth rate (*3*). From these calculations, projections of "demand" are made that, despite their shortcomings, play a dominant role in planning. Because of the failure to recognize participation as a function of the user's opportunity, time, and money (*1*), demand studies have contributed little information about the actual preferences of the population.

Recreation participation is linked to what has been called "opportunity theory" (*11*); i.e., participation depends upon availability. Availability is influenced by a variety of factors: the Bureau of Outdoor Recreation 1965 Outdoor Recreation Survey revealed that the main reason for not participating in an activity *at all* was lack of time followed by lack of opportunity and lack of skill (*33*). Lack of accurate information about existing opportunities also restricts availability. For instance, Lime (*21*) found that one-third of the campers in the Superior National Forest knew only of three or fewer campgrounds, although the area had 36 (the average number known about was only eight).

Another problem in relying upon past participation to guide future decisions is that when opportunities are available, particularly at little or no cost, they will be used. But used should not lead us to automatically assume people are satisfied with existing opportunities or that alternative opportunities might not have been even more sought after.

Preferences generally are obtained orally or in writing. Actual behavior remains perhaps the ultimate test of preferences. The gap between word and deed is a snarl with which social scientists have long wrestled. Careful attention must be paid to reduce this gap. However, surveys can provide important clues about what people seek and their probable response to different programs.

For instance, carefully designed surveys of preference can help measure the range, mix, and intensity of sentiment for alternative outdoor recreation opportunities. Such surveys also can help establish management goals. Goals describe what should be, and must be set by an informed citizenry—not technocrats (*31*). What we often find today, however, are management objectives that reflect the values of managers rather than users (*6*). Because managerial notions about users and their desires are not always accurate (*13*), it is important that policymakers have an objective source of feedback so programs will reflect actual preferences.

Preference surveys also reveal the values people place on alternative outdoor recreation programs and who receives these values. One major role social scientists ought to play in recreation planning is helping to define the nature of the product of recreation programs. Greater attention should be devoted to defining the nature of what we are producing and the basis for its demand.

An understanding of preferences enables planners to balance programs with public desires and to review demand studies. Such review could illustrate gaps in opportunities currently provided (e.g., backcountry areas, facilities for minorities and the handicapped, etc.). Such information is important feedback, particularly with regard to recreation where feedback mechanisms are often absent or inadequate.

The Concept of Substitutability

The concept of substitutability refers to the extent to which recreation activities can be interchanged in terms of satisfying user's motives, wishes, and desires (*12*). It thus has an important bearing on problems of supply because different settings might be capable of providing the same or similar kinds of experiences. This becomes significant when the cost of one location far exceeds another. For instance, many people enjoy sunbathing at the seashore. However, such lands are expensive and becoming increasingly scarce. With a better understanding of substitutability, we might find that we are able to produce the same recreational product on alternative locations that do not require as large an investment as do seashore lands. In turn, we might reserve scarce seashore lands to produce those experiences which cannot be supplied by other settings.

Substitutability is concerned with psychological, sociological, and personality variables that lead to interchange among activities, rather than on the physical characteristics of the activity setting. Cross-country skiing, for instance, would not necessarily represent an appropriate substitute for downhill skiing just because both occur on snow. Very different motives and interests probably exist for these two activities. Cross-country skiing and hiking might be fairly substitutable, however, because they produce very similar experiences, despite the differences in physical setting.

Any recreational activity we might look at probably is substitutable to some degree. A major

question before us, then, is to determine which activities show a high degree of substitutability as well as those which exhibit little substitutability. Trying to do this for every recreational activity, however, would be almost impossible. One method of handling this problem would be to group activities into categories with all activities in one category similar to one another in some way.

One such grouping of recreational categories has been proposed by Hendee, Gale, and Catton (*15*). In a study of recreationists in car campgrounds, and National Park backcountry and National Forest Wilderness in the Pacific Northwest, Hendee *et al.*, (*16*), asked respondents to select, from a list of 26 leisure activities, the six activities they most preferred, in descending order of preference. Those activities chosen as "most preferred" were grouped together into five categories called "activity preference types." The categories were named according to the general type of motivation they fulfilled:

1. *Appreciative-symbolic.*—Included such activities as mountain climbing and seeing natural scenery. The focus here is on appreciation of environmental qualities and preservation.
2. *Extractive-symbolic.*—Hunting and fishing are examples. These activities involved the extraction of "trophies" from the environment.
3. *Passive free-play.*—This category includes painting, relaxing, and sightseeing. The activities typically require little effort and are generally not limited to a forest environment.
4. *Sociable learning.*—This includes such things as nature study, visiting with other campers, and viewing exhibits. The opportunity to interact with others is a primary source of satisfaction.
5. *Active-Expressive.*—Includes water skiing, playing games, and driving motorcycles or snowmobiles. As with passive free-play, these activities do not require a forest setting and are largely focused on the activity rather than the setting in which it takes place.

We would generally expect to find greater substitutability among activities within categories than between. As suggested above, one important part of the substitutability problem is determining what activities show little or no substitutability. These probably tend to be found in the appreciative-symbolic cagetory where the setting (e.g., white-water river-running or wilderness), is a major component of the participant's experience (*12*, *14*).

Discrepancies between the values held by managers and those held by users can lead to conflict. As an example, we find some campers today who participate in camping for its social rewards (meeting new friends, comparing equipment, etc.) rather than as a source of contact with nature (*6*, *20*). Because contact with other people is an important source of enjoyment, it might be possible to produce similar experiences in different settings. Many people decry the growth of new campgrounds, such as the recently proposed "high rise" facility near downtown New Orleans because the activity provided "isn't really camping." Such judgments fail to recognize the diverse nature of the camping experience (*19*).

Perhaps the primary value of the substitutability concept is that it directs attention to the human experiences produced by activities. Activities are simply a means to an end, and planners must focus attention on the product of their programs, not the programs themselves (*5*). As public preferences shift, the relative priority accorded various outdoor recreation programs will also shift. Failure to identify and respond to these shifts could lead to spending that fails to satisfy public desires and creates conditions that might invite vandalism and other destructive behavior (*4*).

The Concept of Carrying Capacity

Carrying capacity refers to the capability of a recreational opportunity to produce a specified type or set of experiences. The experiences to be produced by any given opportunity are outlined in the management objectives.

A basic principle in carrying capacity is that any use produces change. Small amounts of use can produce significant changes in soil and vegetation (*8*, *34*). Similarly, the various dimensions of the recreational experience are subject to change. Where solitude is a key value in the management objectives, even low levels of use can result in adverse impacts; where socialization with others is important, relatively high levels of use might be permissible (*34*). The point is, carrying capacity is not a value fixed solely by physicial-biological conditions (*22*).

Change, either ecological or sociological, is defined as undesirable only when it conflicts with the area's management objectives. The objectives, in turn, are a function of various constraints and factors: ecological conditions,

public attitudes and existing opportunities, and administrative and budgetary considerations. Thus, the manager's task is to determine the "limits of acceptable change" (*8*); i.e., how much change will be permitted to occur before taking steps to prevent further change?

The capacity of a site to provide certain human experiences can be expanded through intensive management. The common response when we seem to have too little of something is to add to the supply; for instance, more acres of land for camping. We can also increase supply, however, by making the acres we have more useful. For instance, it might not be possible to increase the acreage of a campground that is experiencing increasing use. Through the use of management tools, such as more efficient design and location of individual units or the use of plant materials more resistant to use, it might be possible to accommodate a significant increase in use. As suggested above, capacity is not a fixed value; it is responsive to management.

The Concept of Dependent Satisfactions

Recreation resources range from the readily available and common to the scarce and unique. Through a variety of programs, we have tried to protect the unique ones lest they be lost to society for all time, perhaps without a conscious decision.

There is an important difference in the range or continuum of recreation resources that goes beyond mere appearance. On one hand, we have many recreation settings that can be easily duplicated, if they are lost. For instance, a picnic ground that is removed because of a freeway can be rebuilt elsewhere, perhaps almost identically to the original. Other settings are much less susceptible to being duplicated. Wild, white-water rivers simply cannot be recreated once they are destroyed; even if we possessed the technology to do so, the cost would be prohibitive. Economists called this difference in susceptibility to reproduction "asymmetry" (*18*).

Although it is important to understand how opportunities differ regarding our abilities to duplicate them, the major significance of asymmetry is in terms of kinds of experiences these different opportunities produce. On the one hand, we can describe satisfactions common to many settings and that are not uniquely linked to any one particular setting. Visiting with friends is an example. Because of the broad base from which they can be derived, we might label these relatively easily replaced satisfactions as "generic" (*30*). Loss of the recreational resource does not necessarily constitute loss of the satisfaction. On the other hand, certain satisfactions, such as challenge, are specifically linked to particular kinds of environments. We would label these satisfactions "dependent". When the setting is lost, the capability to provide such satisfactions is similarly lost. Wilderness and white-water river are settings that might produce such experiences.

Thus, we can see that those opportunities which we have the least capability of restoring are also the ones which produce these "dependent" satisfactions. From this, one could argue that in allocating resources to different users, those producing "dependent" satisfaction should be reserved if at all possible.

We have little information on the value of the authenticity of recreation opportunity. Certainly, some features of the natural environment can be duplicated, perhaps rather realistically. One can envision engineers hard at work constructing pipes and boilers to create a new "Old Faithful." For many people, the naturalness of their surroundings is of little consequence to the satisfaction they derive (*24*). "Plastic trees" can be as important as real ones (*17*). The concept of "dependent satisfactions" is not to be interpreted to mean that one experience is better than another; it merely calls attention to the relative availability of these experiences and to our ability to duplicate the settings capable of producing these experiences.

The Concept of Externalities

When any land management decision is made, there generally is an effort to measure both the benefits and the costs associated with that decision. But commonly, some of these benefits and costs "escape" off the site. Benefits that are not received or costs that are not borne by a decisionmaker are called "externalities." Air pollution from a factory is perhaps the most easily understood example where a cost (e.g., sulfur dioxide) is not absorbed by a decisionmaker (i.e., the factory) but rather, allowed to become a cost the public must bear.

Many of these external benefits and costs have no direct economic measure; we cannot say how much they cost or benefit us in terms of so-many dollars. Nevertheless, they are real and planners

need to account for them. Although the concept of externalities is founded in economics, other social scientists find it useful. As used here, the objective of the concept is to promote beneficial relationships between different resource programs while minimizing costly relationships.

For instance, few efforts have been made to develop positive and aggressive management programs aimed at the dispersed end of the recreation spectrum, with the exception of Wilderness (*26*). At least some present Wilderness use could probably be better accommodated elsewhere—persons primarily seeking some forms of dispersed recreation (*32*). However, virtually no programs exist for such persons; primitive, non-Wilderness opportunities generally exist as "leftovers" rather than as the result of any deliberate positive effort. Because of the lack of diverse opportunities, conflicts between user groups holding differing value systems, but seeking the same scarce lands, have developed. As a result, different clientele groups often are pitted against one another and the pressures for "either-or" (*23*) have grown.

The general strategy advocated here is that we review the externalities that our resource programs create and, in a sort of "social cost/benefit" analysis, strive to reduce the costs and raise the benefits. To facilitate this, we need to examine the relationships among various programs; for our purpose, let us consider three different types of relationships: (1) Complementary relationships, and (2) supplementary relationships, where development of one opportunity can provide benefits to another; (the development of back-country areas, for dispersed, nonmechanized recreation and the relationship of such areas to Wilderness is an example); and (3) competitive relationships, where changes in one opportunity cause negative impacts on another. Developing roaded recreation opportunities immediately adjacent to Wilderness would create such a relationship.

It seems we can draw two principles from this concept for outdoor recreation planners. First, functional planning (i.e., planning for one resource use at a time) probably tends to create competitive relationships and only occasionally leads to complementary or supplementary relationships. Thus, an integrated, multi-functional planning process is called for. Second, planning programs that provide a package of opportunities will generally encourage complementary and supplementary relationships. For instance, placing the more socially-oriented forms of outdoor recreation opportunities in areas where access is good, while retaining those opportunities dependent on naturalness and solitude in more remote locations should provide a more desirable experience for all concerned (*9*, *10*, *25*).

The Concept of Cost Effectiveness

The discussion up to this point has dealt with concepts that social scientists other than economists might recommend to the outdoor recreation planner. The concept of cost effectiveness, however, is a notion that economists commonly use. Our purpose in including it in this discussion is to consider how the concept might be made more useful with the input of social scientists.

When an administrator decides to spend money for recreational purposes, he would like to know how "good" that decision was. However, because recreation is normally provided free or at only low cost, the normal feedback mechanism, price, is absent. Only rarely are recreation costs met by the consumer; rather, they are subsidized by the public at large on grounds that society benefits because recreation is provided to it (*28*).

Although we previously argued that economic measures of the recreation value are limited in their usefulness, planners and policymakers still need some notion as to how effectively the money they have invested in some recreation project is being used.

Consider the following problem. It has been decided that an area is to be developed as an auto-access campground, of moderate size, and with standard facilities (e.g., picnic tables, fireplaces, pit toilets, etc.). Given that decision, what kinds of information would an administrator need so that the investment returns the most value to the user?

This is a very common problem facing recreation managers today. Occupancy rates in campgrounds are typically very uneven. For instance, on the Superior National Forest, Lime (*23*) found that occupancy rates at individual sites ranged from in excess of 100 percent to only about 10 percent over the summer use season. There, we can see how a knowledge of user behavior could

be very useful in guiding investment decisions. For instance, what are the environmental qualities that make one site more attractive than another? How do people go about choosing a location to camp? Knowing the answer to these and similar questions could mean the difference in providing campsites that cost $2.50 per night with full occupancy to perhaps a hundredfold that figure at only 10 percent occupancy (*27*).

The concept of cost effectiveness calls for planners to give greater attention to the product of their recreation programs. Although costs are an important constraint within which we operate, decisions should be guided by concern for what we are buying rather than costs alone. We must also consider the kind of product an opportunity can produce as well as the demand for that product and its relative availability.

Conclusions

In this paper, we have attempted to describe several social science concepts that have relevance to outdoor recreation planning, particularly when coupled with economic concepts. Because recreation behavior is complex and because there are substantial aspects of it that cannot be easily considered in an economic framework, it seems appropriate that our package of planning concepts be broadly based.

Applying these concepts directly to recreation management problems will be difficult. At the moment, they should be considered broad concerns of which planners must be aware. The pressing task now before social scientists and recreation planners is the translation of these broad, abstract concepts into operational guidelines in the form of specific criteria. Such criteria would allow for increasingly refined notions of the noneconomic trade-offs, costs, and benefits of alternative recreation programs. Coupled with the sophisticated tools and methods of economics, our ability to satisfactorily meet the recreational needs of society should be markedly improved.

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THE CONTRIBUTED PAPERS: A REVIEW

Dennis L. Schweitzer[1]

The 11 contributed session papers contain a wealth of ideas put together by authors from 10 States and the District of Columbia. To briefly summarize what has been said at length is both presumptuous and probably impossible. So I offer here only a few major themes that seem especially significant. But the contributed papers should be read in their entirety.

Two conceptual papers can be used as points of departure for this summarization, for they deal with problems that have been raised many times by many individuals during this Symposium. These are the papers by Convery and Smith and by Shechter.

Convery and Smith note there are really two kinds of problems in valuing outdoor recreation. The first is the one-product case. Given some desired output, we must decide how to achieve that output most efficiently. We must establish a physical production function from inputs to outputs, and we must define the costs of the inputs and the values of the outputs. The parallel to valuing timber or chicken production is exact.

Bond developed this theme for the care of private campgrounds. He particularly emphasized that such campgrounds are but part of a joint product, the other part often being some nearby tourist attraction. As the demand for that attraction increases, user fees in the campgrounds can be raised. He notes that such differential pricing can serve as an economic rationing device, perhaps relieving congestion in campground-short areas.

The second problem addressed by Convery and Smith is valuing recreation outputs as part of a multiproduct production process. What combination of outputs of different types is best, given a limited budget? One approach is to rely on implicit values and tradeoffs, and simply assert how the budget should be allocated, as in Hardie's paper. Unfortunately, it is more often necessary to assign explicit values to outputs of any investments.

Convery and Smith suggest that such values must be
—intellectually defensible. (Is consumers' surplus appropriate?)
—comparable, among different kinds of recreation outputs and the outputs of investments in other forest resources.
—acceptable to those who make decisions. (They must be both understandable and feasible.)

Schuster essentially developed these themes. A final recommendation was that a coherent working group be organized to ensure these criteria are met, and that the calculated values actually be used to influence on-the-ground decisions. This theme was at least implied in several of the other papers.

For example, in discussing the advantages of using gravity-potential models to estimate user benefits, King emphasized that start-up costs in terms of data and dollars and expertise are substantial. Walsh also summarized a number of rather sophisticated adjustments necessary to improve estimations of user benefits. And Beardsley, Schweitzer, and Ljungren noted that as analytical techniques become more useful in answering important questions (this time about the costs of forest land zoning that favors outdoor recreation), the need for dollars and expertise climbs.

One apparent result of the current fragmented approach to applying economics to outdoor recreation has been that some aspects have been studied much more intensively than others. Cope noted, for example, that much more work has been done on making demand projections than on developing an understanding of the costs of supplying outdoor recreation opportunities.

Another conceptual paper, by Shechter, questions the assumptions underlying our view of the future. He noted the prevalent attitude that increasing participation in outdoor recreation inevitably will lead to degradation of our outdoor resources. But he suggests the implicit assumptions of such a view are questionable.

He also suggests that physical degradation is not inevitable. The means exist now to postpone or to alleviate or eliminate such an outcome. He also notes, as do Marcin and Lime, that education, economic factors, and the age structure of the population are all changing in ways that will lead to changes in the aggregate demands for outdoor recreation opportunities.

[1] Economist, Forestry Sciences Laboratory, Intermountain Forest & Range Experiment Station, Forest Service, USDA, Missoula, Mont.

In considering the future of outdoor recreation, a parallel can be drawn to predicting the future of more general economic systems. Consider some words by Kenneth Boulding, one of the prophets of economics:[2]

"I do not say we shouldn't use mechanical models or make projections. But I emphasize that it is usually disastrous to believe them. We have had a lot of success with economic prediction in the last 25 years and it's because we have had nothing to predict. We have had a fantastically stable system. Now we are not at all sure this will go on."

[2] Robert W. Glasgow. 1973. "Boulding: Economist of love and hate—a sketch." Psychology Today 6:61–64, 67–68, 70, 86–87.

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